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This document discusses educational system-environment relationships primarily in the State of California, with full regard for national and other influences. Primary attention is given to the functional and organizational aspects of the educational system and its environment. Before the relationships are specified, a system rationale for education is developed and several relevant dimensions of social system theory and research are reviewed. The organization of the educational system in California is also described. (HW)

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The Educational System and Its Environment

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THE EDUCATIONAL SYSTEM

AND ITS ENVIRONMENT

by

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OPERATION PEP: A State-wide Project to
Prepare Educational Planners for California

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May 1968

FOREWORD

The content of this document has been carefully selected and tailored to provide educational planners and managers with a basic understanding of educational system-environment relationships. Every effort was made to select the most relevant and the most highly-focused materials available in documenting the content presented. In several cases the positions of other scientists have been presented to establish key system-environment relationships.

The author expresses his thanks for the many courtesies extended him by the administrative staff of the Governor of California. In addition, the cooperation of the California State Department of Education is gratefully acknowledged. Much thanks is due to the staff of OPERATION PEP who assisted in the preparation of this document.

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APPENDIX A: Organizational Charts of the California State Department of Education

I. INTRODUCTION

An educational system is a differentiated and highly specialized unit of social organization. Educational systems are created to manage acculturation and socialization processes. As such, educational system development in a culture reflects its evolutionary progress and major differences between cultures can be explained in terms of existing patterns of social organization found in different cultures.

Goldschmidt has presented a straightforward account justifying cultural evolution in terms of ecological considerations:

> Social institutions, which serve to maintain social continuity and to preserve social integration, do not themselves evolve, but rather adjust to new conditions, originating either from environmental change or from technological development. Technology is cumulative and progressive, because useful inventions, once made and accepted, tend to be retained. Each advance in technology, moreover, expands the sphere of possibilities for further advances. Technological development frequently enlarges the interacting human aggregate and hence augments the effective numbers available to contribute and share new ideas. Technological change is subject to adaptive selection - on the basis of both utility within a group and its contribution to the survival of a given group in competition with others. The relevant ecological context, therefore, is not the strictly hypothetical isolated society, but the arena or field of interacting populations.[1]

Thus, the basic criterion for establishing an educational system resides in the need for purposeful and meaningful interaction between units of social organization in a culture. Gross has described the relation of people to social system structure as follows:

> The basic element of system structure in any nation is the people of the country. They are the basis of the entire

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[1] W. Goldschmidt, as presented by Otis D. Duncan, "Social Organization and the Ecosystem," in Robert E. L. Faris (ed.), Handbook of Modern Sociology (Chicago: Rand McNally and Company, 1964), p. 52.

> social system. Land, minerals, and man-made facilities are "resources" only because the people find them useful. Groups exist only because of the interrelations between individual human beings. Social power is exerted by, with, on, and for people individually, and by people acting together in groups. External relations are relations among people. Social and cultural values are never disembodied. They exist only because people hold them. Thus, all the other five elements of system structure are merely ways of elaborating on certain stable characteristics of, and interrelations among people.[2]

The role of education in achieving social purposes can be directly related to society's need to continuously enlarge and renew its human resource potentials. President Kennedy related national progress to education in a dramatic manner:

> Our progress as a nation can be no swifter than our progress in education. Our requirements for world leadership, our hopes for economic growth and the demands of citizenship itself in an era such as this all require the maximum development of every young American's capacity. The human mind is our fundamental resource...[3]

A nation must, therefore, develop its human resource potential in order that it can plan and maximize the potential benefits of its change opportunities.

The United States Constitution does not mention education, but the constitutions of the individual states provide directly, or indirectly, for the establishment and maintenance of a state education system. Thus, education in the United States is regarded as a national concern, a responsibility of the individual states which is generally shared, through delegation, with local education agencies that assume responsibility for administration of educational programs.

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[2]Bertram M. Gross, "The State of The Nation: Social Systems Accounting," in Raymond A. Bauer (ed.) Social Indicators (Cambridge, Massachusetts: The Massachusetts Institute of Technology Press, 1966), p. 187.

[3]John F. Kennedy, National Education Association Convention Address (1963).

At the national level of social organization, considerable policy influence is brought to bear upon the educational process. Decisions and actions by the executive, legislative and judicial divisions of government have affected both quality and equality in educational opportunity. Constitutional guarantees, with respect to an individual's civil rights, have been interpreted to support the development and conservation of the human resources of the nation. In addition, legislation has been enacted to provide incentives for and assistance in the establishment and maintenance of new educational programs for the masses.

Clark has presented mass education as a revolutionary force as follows:

> Mass education also now takes the stage as one of the major revolutionary forces of the twentieth century, especially in traditional societies undergoing modernization where the effects of education in transforming the social structure are crucial in national development. Mass education involves the populace in the operations of the schools and extends concerns about the effects of schooling on individual fate. At the same time that men care more, however, education grows more opaque to the quick and easy glance. The conventional wisdom of the casual observer falls behind as the augmenting size and deepening complexity of education mask many of its characteristics. The understanding of education that everyone possesses from the remembrance of things past, already distorted by sentiment and myth, is confounded by the changing nature of the educational enterprise...[4]

The public school is the most important instrument that society has at its disposal to preserve its heritage and to facilitate its orderly evolution. The decisions of local lay boards of education are made within the context described by Clark. Thus, the people of the nation dictate the policies governing public education. It is important that educators develop a basic understanding relative to how the educational system interacts with

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[4]Burton R. Clark, "Sociology of Education," in Robert E. L. Faris (ed.) Handbook of Modern Sociology (Chicago: Rand McNally Company, 1964), p. 734.

its environment to achieve social purposes.

Education and Social Structure

In his discussion of the "sociology of education," Clark presented four sectors of concern. They were presented as follows:

> ...education and society; the educational institution; the educational organization; and the education subsystems of other institutions. These analytical distinctions are not categories for containing research, for inquiry will normally spill over their boundaries. To analyze features of school organization, one often considers their environmental determinants; to comprehend interpersonal relations in the classroom, one may need to consider the articulation of the school with the labor force. These categories serve simply to delineate major areas of the relation of education to sociology of education...[5]

As Clark suggests the specification of an educational system must serve to emphasize the relation of education to social structure. The structure of a social system reflects the institutionalized behavior of the system.

Wayland has differentiated between four types of structure which are intricately interrelated within an educational system:

> The first of these types is the <u>formal organization</u> of education, as it is publicly understood. This includes such features as the U. S. Office of Education, the state department of education, local school boards, and local school systems as they might appear on a line-and-staff chart. Private and parochial school systems would also be included here.
>
> The second type is <u>ancillary structures</u>: deliberately and formally organized systems, not a part of the formal organization, which contribute to the functioning of the educational system in specific ways. Some of these are highly visible and have relatively well-established linkages to the formal structure (Parent-Teacher Associations, for example); others are more remote (school committees of local mental health organizations, companies engaged in the manufacturing of school buses, etc.).

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[5] <u>Ibid</u>., pp. 735-736.

> The third type of structure is the autonomous group made up of individuals within the educational system. Friendship groups or cliques of this type may be viewed individually, or the linkages between them (within a particular system) may be examined as a network which constitutes an informal organization. This type of structure is less stable than the first two types, since it is partially dependent on the particular persons who are members of a system at any point in time.
>
> The final type, institutions, is made up of these relationships within a system which are functions of prescribed norms. Explicit formulations of appropriate behavior of this type are not necessary, since they have come to be accepted as given in the system. For example, much of the interaction between teachers and students follows prescribed norms which have been learned...but which are not covered in formalized rules of conduct. When norms governing institutions are brought into question, explicit rules may be established, and thus a shift occurs from institutions to formal organizations...[6]

The foregoing discussion implies that a structure-performance relationship exists between the educational system and its environment. The following subsection presents a framework for analyzing system-environment relationships.

An Analytical Framework for Investigating System-Environment Relationships

Cooper, Leavitt and Shelly have presented a list of organizational characteristics which can be used to investigate the organizational aspects of an educational system. They stated that:

> No claim of completeness can be made, but a wide range of organizational characteristics is outlined.
>
> 1. Characteristics of group task or problem, situation, and setting. Factors defined by the primary task (for each separate task group):
>
> Area and level of knowledge and skills required.

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[6] Sloan R. Wayland, "Structural Features of American Education as Basic Factors in Innovation," Matthew B. Miles (ed.), Innovation in Education (New York: Bureau of Publications Teachers College, Columbia University, 1964), pp. 587-590.

Hazards and risks involved.
Novelty of situation to participants.
Procedures permitted.
Information required and available.
Number of participants, required, permitted, or available.
Material and facilities.
Degree of personal contact involved.
Role expectations regarding participants.

2. Group structure.

Stability of reciprocal expectations achieved by group; time in operation; reorganization, turnover.

Formal structure: intragroup patterns.

Group goals: definiteness; clarity; relation to basic objectives; relations to personnel capabilities and facilities; unusual aspects.

Membership patterns: requirements of experience; training; special qualifications; restrictive requirements (age, sex, race, religion, etc.) permeability of entrance and exit conditions; voluntary nature time commitments.

Control of group members: freedom of movement, goals, expresssion, dress, schedules; regulations re conduct, work, living arrangements; rituals, ceremonies, standard operating procedures; regulation of group procedures; work controls; regulation of participation in activities; communication channels and practices.

Stratification; status hierarchy; power structure.

Modus operandi, including methods of communication, supervisory methods, procedures, decision-making, training.

Responsibility structure: organization and relationships of roles; departmentalization, division of labor among subgroups; role responsibilities (for what, to whom), power, privilege, prestige; requirements re individual qualifications; space and facility requirements; status mobility provisions.

Rewards; compensation; welfare; provision for individual and group satisfaction; incentives, recreation; benefits.

3. Formal structure: intergroup patterns.

Autonomy of organization and subgroups.
Pattern of centralization-decentralization.
Social status of organization and subgroups ("league standing").

Patterns of dependency, cooperation, competition in relation to other organizations.

Requirements concerning communication and transactions with other organizations.

Operating patterns, including conformity to formal patterns.
Goals.
Membership patterns.
Control.
Stratification, status hierarchy, power structure.
Modus operandi.
Responsibility structure.
Rewards, compensation, welfare, etc.

Intergroup patterns.
Superior-subordinate behavior patterns.[7]

The same authors developed a rationale for investigating the physical and social aspects of the environment. They stated that:

> The following outline includes both aspects of the environment. Although an attempt has been made to be comprehensive, it is expected that some conspicuous hiatuses will be found.
>
> 1. Physical aspects of the environment:
> Gravity.
> Radiations and radioactive fallout.
> Climate and weather: temperature; humidity; atmospheric pressure; oxygen tension; atmospheric changes (winds, storms); rainfall; snow; ice and related phenomena.
> Terrain: rivers, lakes, mountains, valleys, deserts, forests, swamps, coastal plains; elevation, erosion; earthquakes, etc.
> Natural resources: sources of food (fish, game, vegetation, crops), shelter, clothing; minerals; timber; water.
> Culture products: facilities and technology related to transportation, power, communication, construction, manufacturing, distribution, agriculture, housing, habitability, warfare; characteristics and location of centers of population industry, government, education, research, entertainment, recreation, arts.
>
> 2. Social aspects of the environment:
> Nonmaterial culture: ascriptive solidarities (family, kinship, relationship systems; ethnic solidarities; primary groups; territorial community); occupation and economy (economic institutions, organization of the economy, units of the economy, economic trends); stratification and mobility of the population (class, occupation, social stratification); political organization and authority (political power, political organizations); religion and society; linguistic patterns; education; law; the arts, recreation, and entertainment; technology; science, value systems, beliefs, symbolic systems, health and welfare.
> Social and economic states: level of the economy, health, education, crime, morality, morale, intergroup tensions, cold war, strikes, disasters, etc.

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[7] William W. Cooper, Harold J. Leavitt and Maynard W. Shelly II. New Perspectives in Organization Research (New York: John Wiley and Sons, Inc., 1964), pp. 523-524.

> Factors defined by locales and geographic setting of the organization: physical and social factors peculiar to locales, remoteness, physical restraints (communication, travel, mobility), parameters of nonmaterial culture, social and economic states applicable to sites and locales of operation.
>
> Relations with other organizations: hierarchical relations with parent and subordinate organizations, sources of support, competitive organizations, sources of threat and conflict; relations with unions, clients, regulatory agencies, trade associations, community groups, eleemosynary agencies, etc.[8]

The following discussion of educational system-environment relationships will be detailed in terms of those relationships which are known to be prevalent within the State of California with full regard for national and other influences. Primary attention will be given to the functional and organizational aspects of the educational system and its environments. Realizing the impossibility of developing a complete explanation of system-environment relationships, the following specified relationships will be limited.

Before specifying educational system-environment relationships, let us develop a system rationale for education and review several relevant dimensions of social system theory and research. Thereafter, the organizational dimensions of the educational system in California will be presented. Finally, system-environment relationships will be specified and discussed.

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[8] Ibid., p. 529.

II. DEVELOPING A RATIONALE FOR SPECIFYING SYSTEM-ENVIRONMENT RELATIONSHIPS

The development of a rationale for specifying system-environment relationships will provide a functional and organizational gestalt within which the characteristic actions, patterns and structures of the system can be studied. In addition, the same gestalt can be used to analyze the fundamental interactions which take place between a system and its environment.

The Origin and Development of the System Concept

The system concept is not new, but like every other concept, man's present understanding, interpretation and application of the concept reveals an evolution in its meaningful utilization. The concept has been expanded, during the course of its evolution, and has been validated as a meaningful logic construct through historical use and subsequent appraisals.

Many writers have presented definition for the term "system" yet no one definition can encompass the broad variance found in its utilization. Johnson and others have cited the probable cause of such variance in that:

> A system is "an organized or complex whole; an assemblage or combination of things or parts forming a complex or unitary whole." The term system covers an extremely broad spectrum of concepts...The word system connotes plan, method, order, and arrangement. Hence, it is no wonder that scientists and researchers have made the term so pervasive.[9]

The system concept can be traced back to ancient civilizations that viewed the universe as a system of interacting phenomena. These early scientists explored every available method and means which might aid them

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[9]Richard A. Johnson, Fremont E. Kast and James E. Rosenzweig. The Theory and Management of Systems, (New York: McGraw-Hill Book Co., 1967) pp. 4-5.

in their attempts to conceptualize interrelationships among complex phenomena and enable them to integrate these interrelationships into a systematic whole. Thus, the system concept can be historically associated with man's early search for understanding of natural phenomena.

It was man's curiosity and his desire to understand and predict the behavior of theoretical and natural systems that prompted his quest for knowledge. As the dimensions of the universe and knowledge were widened, the system concept expanded. This expansion was due, in large measure, to the increasing complexity of the problems and the contexts which man sought to understand.

Additional expansion of the system concept was prompted by the time limitations imposed in problem-solving and decision-making activities. Time considerations in problem resolution stimulated the development of more efficient methods and means for fulfilling response requirements. These considerations necessitated that problem and context assessments be conducted in shorter periods of time in order that solution method derivation and problem resolution could be effected in real time.[10] In addition, new demands were experienced to achieve higher specified levels of performance proficiency and improved levels of quality assurance. Thus, an integrated body of multi-disciplinary system theory was developed for use in the resolution of complex problems. Further, the developing field of system technology presented new, logically-based procedures, tools and skills which could be used in the assessment of multivariant physical and social problem contexts.

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[10]Real time is defined as that period of time which extends from the present to some specified deadline in the future. Thus, it is the period of time available for performance.

A context is a definable and measurable unit of performance and organization consisting of a set of related and interacting factors and events which are perceived to exist within the boundaries and dimensions of the unit. Contexts can be defined relative to performance requirements, problems and planned change. Thus, a context is a designated portion of a system which encompasses the particular set of variables and/or phenomenon to be investigated. Any context can be explained in terms of situations, conditions and characteristics.

Contextual situations are the domains of circumstance in which the context is located. Such domains of circumstance include external, internal and interface relationships and interactions. Thus, contextual situations include those domains of circumstance which serve to explain the dynamic aspects of the context in relation to the dynamic aspects of its surroundings, or environment.

Contextual conditions are defined as the states or modes in which the context exists or which gave rise to the context. Such conditions are used to define the precise nature of the existing context and the situational antecedents which served to influence the nature of its present existence. The definition of conditions is performed using a functional approach to context analysis and explanation.

The characteristics of a context are the descriptive, qualifiable, and quantifiable features of a context which can be used to describe its precise nature. Thus, characteristics are descriptors of the context which facilitate both its definition and its measurement.

The application of the tools and techniques of logical analysis and synthesis processes to a given context will produce the relevant information

required to understand the dynamics of the context and explain the characteristic actions, patterns and structures it exhibits in performance. When logical analysis and synthesis procedures have been used to investigate complex problems which can be defined within a designated context, man has been able to derive the relevant information required to understand the functional aspects of the problem and its context. In addition, this understanding has facilitated the synthesis of alternative solution methods for resolution of the problem.

Historically, then, the system concept can be traced through the developing discourse of logic, philosophy, science, mathematics and religion to its present usage and interpretation. The concept has proved to be especially valuable in logic and philosophy. The methods of science embody the concept since they depend upon the orderly nature and the discipline it enabled man to achieve as he sought to develop a more logical understanding of theoretical and natural systems confronting him.

The Problem of Formulating A Definition for the Term "System"

The formulation of a definition is a purposive act which is performed to achieve a specified objective. The levels of difficulty experienced during formulation is proportional to the complexity and pervasiveness of the term to be defined. Additional difficulty is experienced when the specified objective is broadly conceived. Thus, the formulation of a definition for the term system which encompasses the dynamics of an educational system represents a difficult problem.

The objective, then, is to synthesize a definition for the term system which will provide educators with a conceptual understanding of functioning

educational systems. Such an understanding will facilitate the development and utilization of a functional approach to problem solving within any dynamic educational context. In addition, educators will be provided new insight relative to the management of performance in dynamic contexts. Using this objective as a principal focus, it is possible to assess available system definitions, specify relevant definition elements and synthesize a new definition for the term system.

Assessment of System Definitions. Consider the following definitions which have been formulated for the term system:

1. Orderly combination or arrangement, as of parts or elements, into a whole; specifically, such combination according to some rational principle; any methodical arrangement of parts.
2. In science and philosophy, an orderly collection of logically related principles, facts or objects.
3. Any group of facts and phenomena regarded as constituting a natural whole and furnishing the basis and material of scientific investigation and construction; as the solar system.
4. The connection or manner of connection of parts as related to a whole, or the parts collectively so related: a whole as made up of constitutive parts; as a railroad system.[11]

5. The structure or organization of an orderly whole, clearly showing the interrelationship of the parts to each other and to the whole itself.[12]

6. The sum total of separate parts working independently and in interaction to achieve previously specified objectives.[13]

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[11] Robert C. Preble, Britannica World Language Dictionary (New York: Funk & Wagnalls Company, 1956), pp. 1323-4.

[12] Leonard C. Silvern in Henry A. Bern and Others, "Reply to Questions About System," Audiovisual Instruction, X(5), p. 367.

[13] Roger A. Kaufman and Robert E. Corrigan, The Steps and Tools of System Analysis as Applied to Education (Burlingame, California: OPERATION PEP, 1967) p. 3.

It is evident that the term system "connotes plan, method, order, and arrangement" as previously suggested by Johnson and others.[14] Silvern's definition cites order and arrangement in relation to a dynamic whole. The idea of interaction between parts ("to each other and to the whole itself") is an essential element for any definition of the term system.

The Kaufman and Corrigan definition presents the idea of action which can be related to the achievement of previously specified objectives. This suggests that a system functions in accordance with performance requirements. A performance requirement is defined as any requisite condition which must be established and/or maintained during the execution of defined duties according to some method or plan.

The cited alternative definitions also suggest that a system represents a gestalt; that is, it represents a dynamic arrangement of separate components which through action, pattern and structure are so integrated that they appear and function as a unit (whole) that is more than the sum of the parts.

This idea is especially important when synergism is a probable consideration. Synergism is a performance quality which is defined in terms of the functional interaction of discrete components such that the total effect exhibited in performance is greater than the sum expected based upon a study of the individual parts considered separately. The dynamic state created by combining, joining, relating, or associating the individual parts produces synergesic effects in performance. Thus, synergy is a real performance benefit which results from the establishment of a gestalt which,

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[14]Johnson, Ibid.

in turn, is the desired objective of functional organization in any system.

Specification of Relevant Definition Elements. An adequate definition for the term system must encompass the following elements in order that it facilitates the achievement of the specified objective:

1. "an orderly combination of interrelated and interacting parts which constitute a rational whole"
2. "plan, method, order, and arrangement"
3. "interaction of the parts to each other and to the whole itself"
4. "interaction to achieve previously specified objectives"
5. "combination and interaction according to rational principle"
6. "gestalt and synergism in relation to performance"

The above cited elements overlap to some extent, but in the aggregate they represent the relevant elements which must be incorporated in the definition.

Formulation of a Definition for the Term System. The following definition has been formulated from the statements presented in the preceding section:

> A system is an orderly combination of interrelated and interacting parts which constitute a rational whole and which create a functional and organizational gestalt through the purposive and collective effort of the separate parts working independently and in interaction to achieve previously specified objectives.

An objective is defined as a goal or end of performance which can be expressed in measurable terms. The term performance refers to the execution of duties which must be completed in a specified manner according to an accepted method or plan. Generally, performance is controlled by planned expenditures of effort and measured using criteria (standards or measures

by which performance effectiveness can be judged).

Thus, a system is an orderly combination of interrelated and interacting parts (actions, patterns and structures) collectively constituting a functional and organizational gestalt which exhibits synergy in the achievement of previously specified objectives. The parts of the system can be investigated separately, studied in relation to each other, or studied in relation to the gestalt. The system and its parts are best studied using a functional approach; that is, an approach which facilitates investigation of the system as it exists in its dynamic state.

The Specification of Basic System-Environment Relationships

The previously stated definition for the term "system" presents a conceptual baseline which can be utilized in the specification of system-environment relationships. The definition implies that the system directs its effort according to plans for the achievement of performance purposes. Generally, culturally-based systems are conceived, established, organized and maintained to provide differentiated services and/or to perform specialized functions for society. As such, a culturally-based system can be regarded or studied as a context of a larger system. The term system is, therefore, generally made relative to the principal gestalt under consideration. Any designated portion of that gestalt can be defined as a functional and organizational context.

A system has both an external and an internal environment. The term "system environment" is assigned to that portion of the gross environment which exists within the boundaries and dimensions of the system. The larger context to which any system can be related is called the "environment".

The environment includes all external and system-environment interface situations and conditions which affect the system at any stage and/or in any state of its existence. Generally, a consistent set of characteristics can be defined to explain both the system and the environment.

An educational system is a collectivity of social institutions in which specified units serve specific purposes. Each unit can be related to other units in the system by describing its functional and organizational inter-relationships and interactions. The most central element in system-environment relationships and interactions is the formal policy-making structure of the system. The policy-making structure serves as an organizational control device of the cultural environment which created the educational system. Etzioni has stated that an:

> Organizational control structure is a distribution of means used by an organization to elicit the performance it needs and to check whether the quantities and qualities of such performance are in accord with organizational specifications. The means used differ in their availability to the organization and in the performance they elicit as judged by service to organizational goals and needs.
>
> All social units have a structure and control their members, but organizations have a distinct structure, and their problem of control is especially acute. Organizations are social units that serve specific purposes. They are planned, deliberately structured, constantly and self-consciously reviewing their performances, and restructuring themselves accordingly. In this sense, organizations are unlike natural social units, such as the family, ethnic group, or community. The deliberate structure of organizations, their intensive concern with performance as well as their tendency to be considerably larger than natural units, make informal control insufficient and primary identification inadequate...[15]

Hence, school boards were formally constituted as organizational control

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[15] Amitai Etzioni, "Organizational Control Sturcture," Handbook of Organization James G. March (ed.), (Chicago: Rand McNally and Company, 1965) p. 650.

structures for educational systems. These boards have been institutionalized to allocate the rewards and penalties of the cultural environment to enhance compliance with social norms, regulations and requirements. Thus, school boards have been constituted to define the value-based performance expectations and goals of society and, thereby, to assure and control the quality of educational system performance.

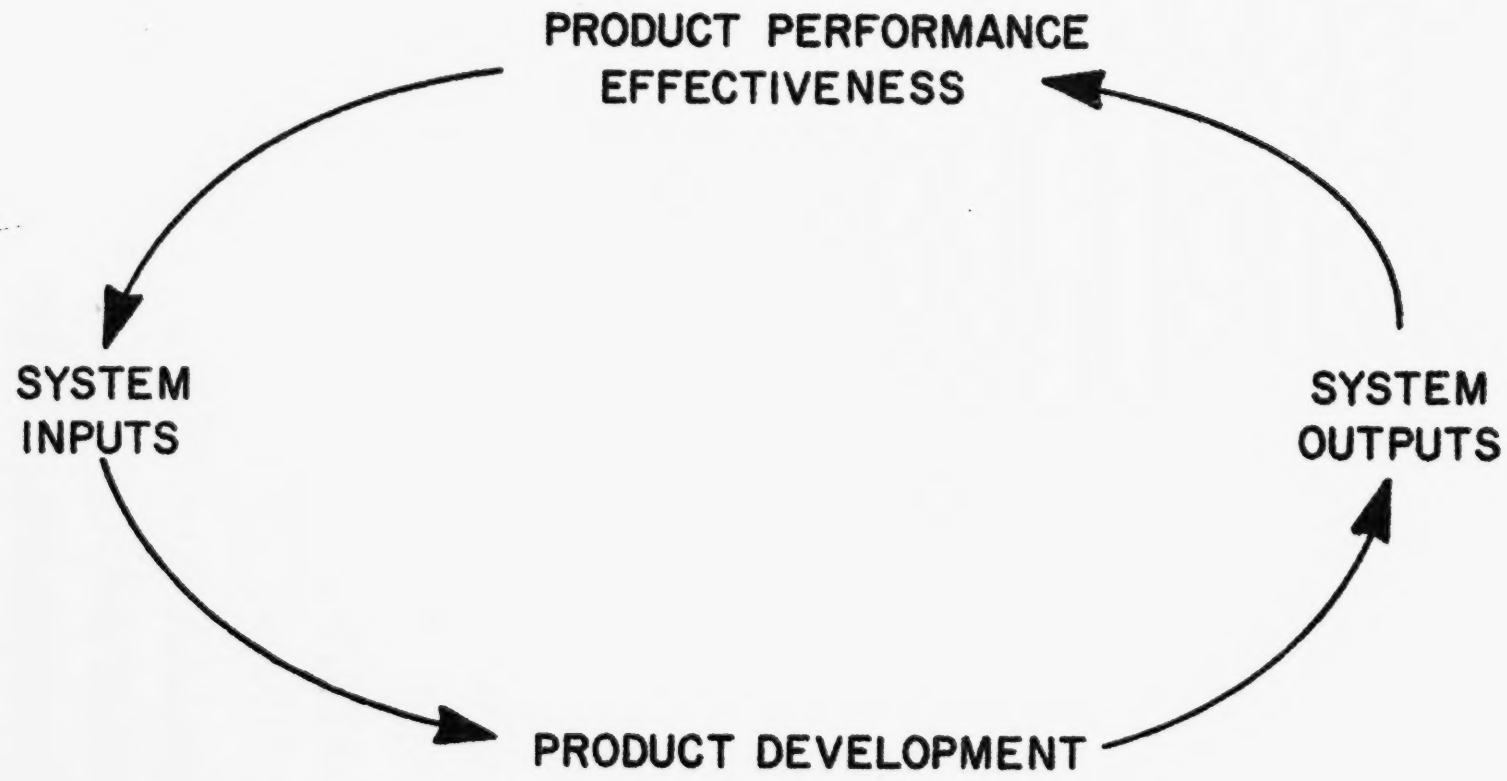
Since school boards represent the most central organizational element in the pattern of functional relationships which exist between an educational system and its environment, the remainder of this discussion will maintain a focus upon the roles of school boards.

A Closed-Loop Pattern of System-Environment Relationships. A general pattern of performance relationships (see FIGURE 1) can be specified to exist between an educational system and its environment. The system depends upon the environment for certain inputs; namely, resources, energy and information. Once received, these inputs must be managed and conserved in order that system performance effectively and efficiently develops the products specified in the performance requirements (which were received, as information, from the policy-making structure). The evolved performance products of the system constitute its outputs. The outputs are delivered to the environment in fulfillment of the performance requirements. The environment determines the effectiveness of system performance by judging the quality of system products and services according to the previously specified requirements.

Thus, a closed-loop pattern of system-environment relationships can be explained in terms of system inputs, product development, system outputs and product performance effectiveness. Since the roles of school boards are central to this discussion, the closed-loop will be explained using

CLOSED-LOOP PATTERN OF SYSTEM-ENVIRONMENT RELATIONSHIPS

FIGURE 1



such roles as the beginning and the ending point of discussion. School boards function by defining performance requirements for educational systems. These requirements are defined to reflect the goals, expectations and values of society. In addition to defining the performance requirements, school boards must also make many decisions relative to system inputs. Resources, energy and information must be provided to facilitate system performance.

System Resources--The physical, human and financial resource requirements of an educational system must be assessed. In the physical resource area, this requires that school boards make decisions and justify the need for school plant, facilities, equipment, and materials. Further, in the human resource area, the board must decide and justify needs for certificated, classified and consultant staff requirements. Further, school boards must assess the student populations which comprise the most valued human resources provided to an educational system. In addition, the financial requirements of the system must be decided and justified. Every decision and justification must be related to the specified performance requirements which the school board has defined. Finally, each decision must be justified in relation to the anticipated value outcomes of performance.

Energy--The school board, as an organizational control structure for the environment, must provide sufficient energy to the system to facilitate the achievement of performance objectives. The acquisition of energy is a primary and inescapable prerequisite for performance. Since energy is noncyclic and is used up by system action, a continuous supply is required. In addition, the flow of energy through the system, where energy may be transmitted, stored, transformed, and subsequently utilized in product development, is continuously reduced and degraded resulting from inefficiency. Further, the efficient

utilization of energy depends upon the quality of system resources and information (instructions) on how the energy is to be expended. Finally, all product development activities, related transformations and movements of resources and information require energy.

Three key concepts can be defined in relation to the efficient utilization of energy:

Entropy--A measure of the unavailable energy in the system (usually due to functional and/or organizational inefficiency).

Synergy--An energy effect such that the total effect produced through cooperative interaction by discrete parts of a system is more than one could predict based upon an assessment of individual parts.

Catalysis--The process and act of utilizing an agent (catalyst) to modify the rate of reaction, and thereby, the rate of energy utilization.

Generally, the management and conservation of energy is concerned with reducing entropy, increasing synergy and developing new energy reducing catalysis methods-means. Since each of the foregoing would increase the supply of energy available for product development, each bears important implications for the management of system performance.

Information--An educational system requires reliable information relative to environmental expectations and performance goals. Since the cultural environment is experiencing continuous evolutionary growth and development, new demands for system performance will be generated. The educational system needs information relative to every aspect of system-environment interaction. Thus, the system must systematically secure information which can be related to both processes and products of performance.

Generally, information handling procedures are developed for the selection.

acquisition, storage, retrieval, analysis, synthesis, evaluation and validation of information. Management control of product development processes is central to an institutionalized communication network which is designed to facilitate the functional and organizational aspects of performance. Carefully designed feedback and control loops are incorporated within the network to provide information and assure quality in performance. In addition, external sensing networks are established to secure relevant information from the environment regarding system performance.

Information must be secured relative to (1) the flow of resources and energy into the system, (2) transformations of resources and energy during product development, (3) transfer, storage, retrieval and allocation of resources and energy during system performance, and (4) the characteristic actions, patterns and structures involved in the utilization and dissipation of resources and energy in product development.

Product development is a system process which can be related to system inputs and system outputs in terms of the defined performance requirements. System inputs must be conserved in order that system outputs can be maximized. Further, product development must be managed in order that performance effectiveness, process efficiency and required levels of performance proficiency will be achieved through system performance.

The environment of education places high emphasis upon the achievement of desired benefits and therefore, the production of value. The value assigned to an educational system is proportional to its ability to produce desired benefits for the society that it serves. It is the continuing task of policy-formulating leadership to seek constantly to define the anticipated value

outcomes (consequences as well as benefits) of performance in all their manifestations, in all segments of the environment which judge the worth of educational services and products. Therefore, the value assigned to educational products, processes and services by environmental judges is proportional to the benefits achieved through product performance. Thus, the performance capability of the terminal products of an educational system is a very important management consideration.

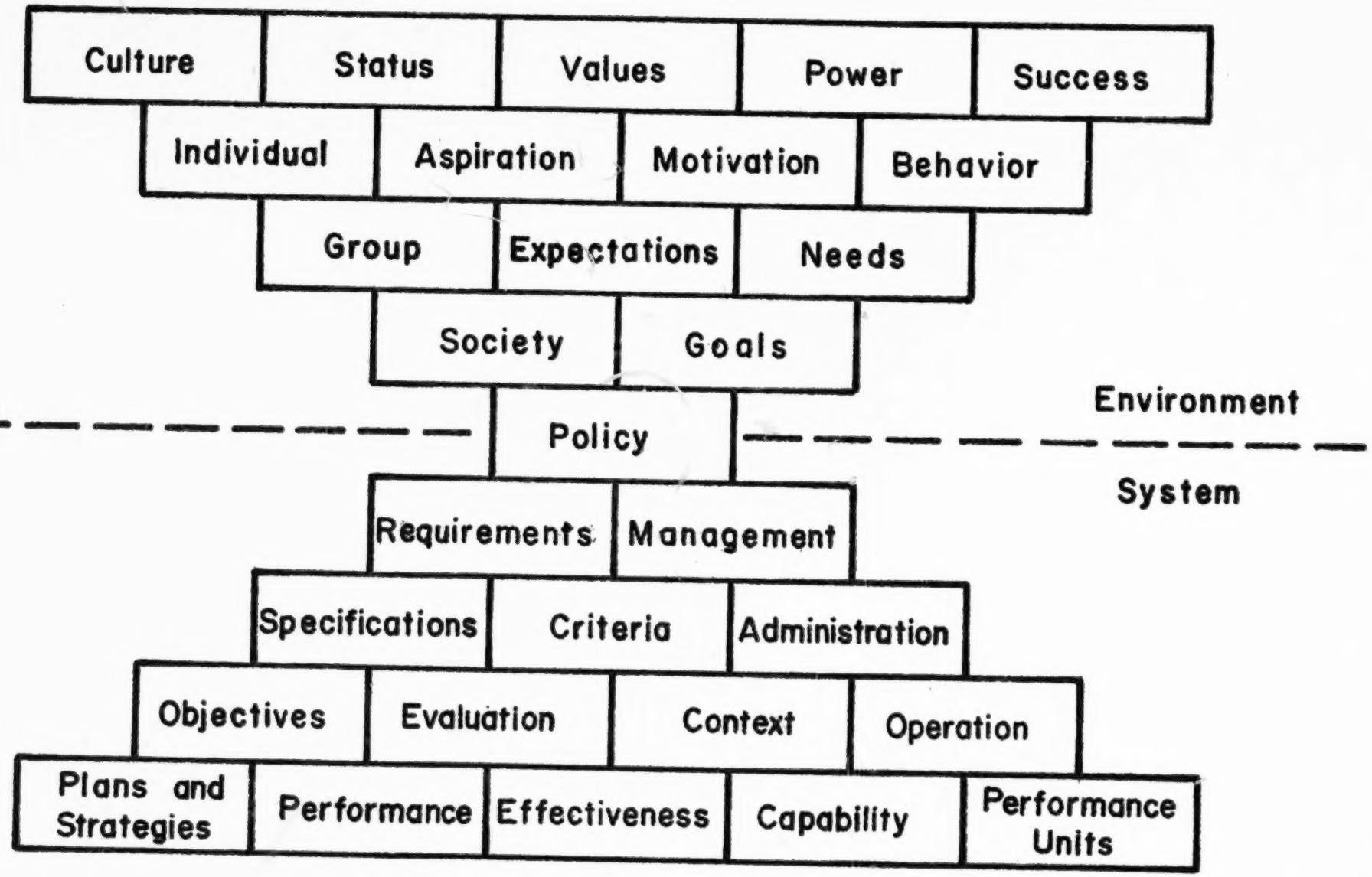
The closed-loop pattern of system-environment relationships is, therefore, a pattern of value relationships. The culturally-based values used to determine the performance effectiveness of system products are also basic to the performance requirements which were defined for system performance. The roles of school boards serve to close the loop and complete the cycle. Realizing that the quality and quantity of system inputs are determined either directly or indirectly by the nature of the social benefits derived through the performance of system outputs, it is not difficult to define a detailed list of system-environment relationships. Each of these relationships can be assigned a position in the closed-loop pattern of relationships which has been presented (See FIGURE 1).

Policy-Formulation and Policy-Implementation Relationships. Policy decision relationships have been specified to exist between the system and its environment. An analysis of these relationships will provide needed dimensions of understanding for specifying additional system-environment relationships. The dominant values held by key functionaries in the cultural environment of an educational system generally are reflected in the decisions made by policy-making bodies in that environment.

FIGURE 2 specifies the policy-formulation and policy-implementation

Policy-Formulation and Policy-Implementation Relationships

FIGURE 2



relationships which exist between a system and its environment; especially, when the policy-making body is representative of the environment. The upper half of the model relates to decision antecedents which influence policy formulation processes. The lower half of the model relates to subsequent management policy-implementation procedures. Since the dominant values of the environment are sources of criteria used to judge the effectiveness of system performance, two patterns of relationship can be established.

First, management personnel of the system can perform an environmental analysis in an effort to determine the pattern of dominant values which are operative in policy decision making. In addition, the priority expectations of the environment relative to system performance can be assessed. Thus, the dominant values and priority expectations can be determined and compared to the policy decisions being made. This information will enable management personnel to develop an operational philosophy for system performance, establish ormance criteria and appraise the effectiveness of system performance.

The second pattern of relationships can be established by relating the dominant values held by key functionaries in the environment to system products and services in an effort to determine the effectiveness of system performance. Thus, this pattern of relationship exists between the system, system products and services and key functionaries in the environment who utilize system products and/or services. Environmental analysis would, in this case, involve need assessment and the determination of environmental preferences, attitudes and demands.

Whereas, the first pattern of relationships deals primarily with values and expectations in relation to system policy, products and services; the second pattern of relationships deals with products and services evaluation

in relation to environmental values. Thus, the first pattern of relationships has an input orientation while the second has an output orientation. Together, they establish a closed-loop pattern of relationships.

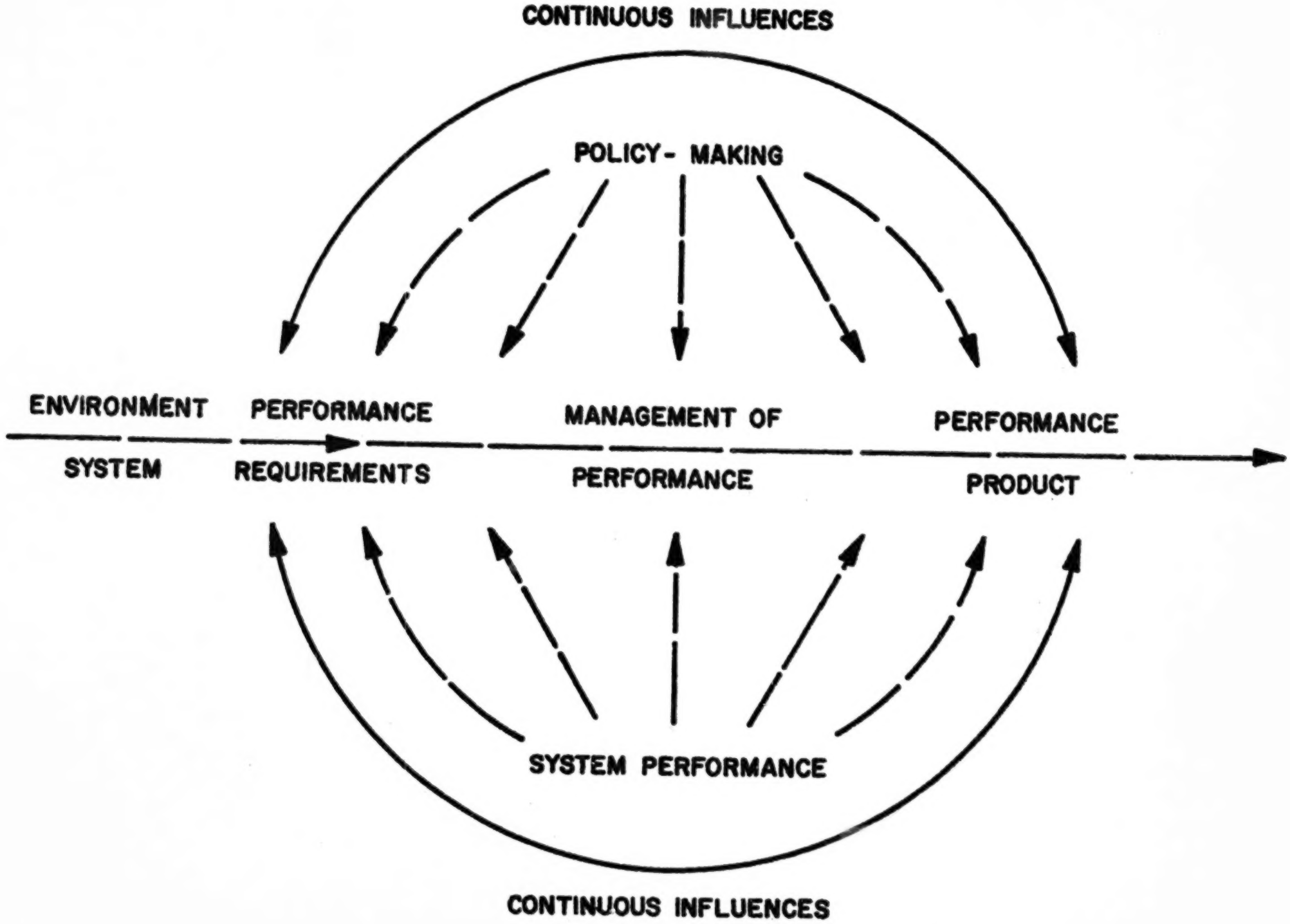
Thus, the environment can be regarded as exerting continuous policy-making influence upon the management of system performance by specifying performance requirements and defining the nature of system performance products as suggested in FIGURE 3. This model also suggests that institutionalized patterns of system performance also exert continuous influence upon system-management decisions. Thus, policy decisions for change can be expected to experience negative influence when implemented in the system. The management personnel must attempt to maintain a delicate balance between these continuous sources of influence in an effort to manage system performance in such a manner that the system will efficiently and effectively achieve its goals and fulfill its requirements.

Areas of Concern for Educational Planning and Management

The specification of system-environment relationships cannot be completed independent of human judgments and concerns. At every key position in the environment as well as the system, the interaction of human beings largely determines the course of action demonstrated as performance. As is indicate in FIGURE 2, the values, aspirations, motives, needs, expectations and, therefore, perceptions of individuals are conditioned by the attachments each individual is able to effect in the cultural context. Thus, the pattern of human concerns and the priority relationships which exist among these concerns are predicated by situational antecedent which may be remotely or immediately related to these concerns and the individual's present perception

A MODEL OF PERFORMANCE INFLUENCE

FIGURE 3



of them.

The areas of concern for educational planning and management are partially presented in FIGURE 4. Each area of concern represented in FIGURE 4 consists of the three principal interfaces which are indigenous to the area of concern under consideration. Each area of concern can be related to the school and, therefore, individuals representative of one area of concern can use this pattern of relationships to analyze the concerns of individuals located in other areas. One must realize, however, that the areas of concern represented reflect concern in relation to the school as the individual perceives it from his vantage point.

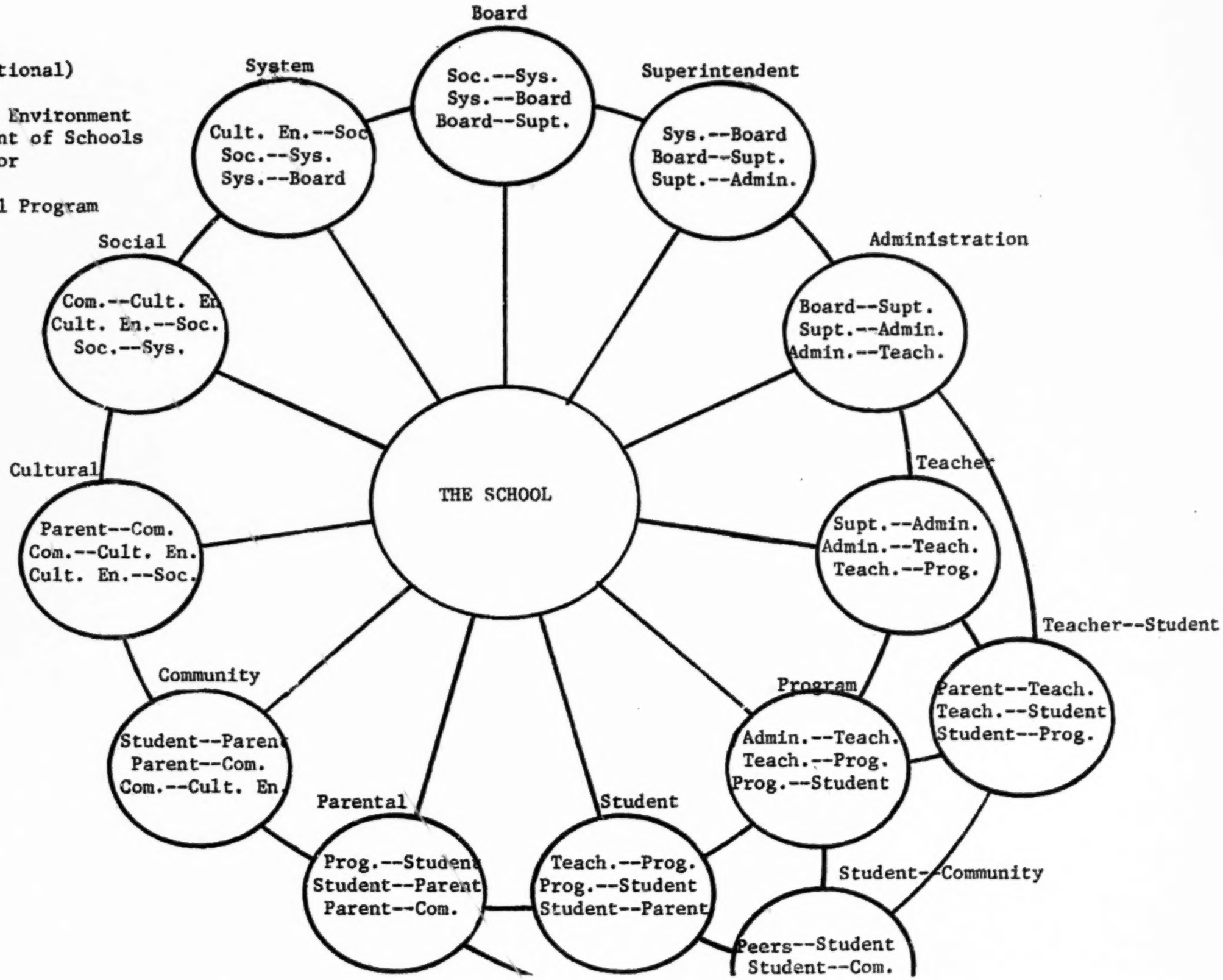
It is interesting to note that the program area of concern interferes between the areas of concern for teachers and students. Therefore, a shunt has been developed which includes teacher-student student-community interfaces which can be related to administration, teacher, program, student and parental areas of concern. The complexity of the relationships which exist among these areas of concern clearly indicate the multiplicity of functional interfaces which must be maintained to facilitate the learning process. Each individual represented by an interface will be affected in performance by the system of beliefs which serve to guide his actions.

The areas of concern for educational planning and management represent a significant dimension for consideration in the specification of system-environment relationships. A cursory examination of the array of areas of concern presented in FIGURE 4 will reveal that elements of the environment, as well as the system are represented. Each area of concern is no less important than any of the others and, therefore, these areas of concern provide a framework for the investigation of yet another pattern of system-environment

AREAS OF CONCERN FOR EDUCATIONAL PLANNING AND MANAGEMENT

FIGURE 4

Sys. - System (Educational)
Soc. - Society
Cult. En. - Cultural Environment
Supt. - Superintendent of Schools
Admin. - Administrator
Teach. - Teacher
Prog. - Instructional Program
Com. - Community
Peers - Peer Group



relationships.

In concluding this section of discussion it can be noted that primary attention has been given to generic system-environment relationships. The social, economic and political relationships which exist between a system and its environment have not been presented. The next section of this document will present relevant documentation which will establish patterns of relationship in these areas.

III. RELEVANT SOCIAL, ECONOMIC AND POLITICAL SYSTEM-ENVIRONMENT RELATIONSHIPS

The school is society's instrument for social renewal. Thus, as society experiences continuous evolutionary growth and development, it generates new needs which result in demands for educational change. The school, as an organization, must continuously seek to renew itself in terms of the changing requirements of society. Two patterns of individual renewal can be related to social and educational renewal: (1) renewal of individuals in society, and (2) renewal of educators in the educational system.

Since change is inevitable, educators must plan and manage continuous change processes to meet new social demands, meet new contingencies and provide for their own self-renewal. FIGURE 4 revealed several areas of concern for educational planning and management. These areas of concern are mutually interrelated and provide a basis for studying the many influences which are operative in educational problem solving and decision making.

Participation in the resolution of complex culturally-based problems represents a new field of concern for education. The resolution of such problems depend upon cooperative interaction by national, state, county and local agencies. Relevant information, energy and resources must be identified, acquired, allocated and utilized in a collaborative effort to resolve priority problems. New patterns of involvement and new methods of achieving maximum productivity must be developed in order that desired levels of performance effectiveness might be achieved in cooperative endeavors. Educational planning and management can no longer be isolated from corresponding activities taking place in other cultural, social, economic and political sectors.

Educators need to develop a basic understanding of the relationships which exist between the educational system and the social, economic and political sectors of influence present in the environment.

The Functional Imperatives of Social Organizations

Relative to the development of basic understanding of social, economic and political relationships which exist between an educational system and its environment, educators must realize that the educational process (like processes in any social system) is subject to four independent functional imperatives or problems. Parsons and Smelser have discussed how each of these functional imperatives relate to the persistence of the social system. They have stated that:

> A social system is always characterized by an institutionalized value system. The social system's first functional imperative is to maintain the integrity of that value system and its institutionalization. This process of maintenance means stabilization against pressures to change the value system, pressures which spring from two primary sources: (1) Cultural sources of change (pattern maintenance)...(2) Motivational sources of change (tension management)...
>
> Every social system functions in a situation defined as external to it. The processes of interchange between system and situation are the foci of the second and third major functional imperatives of the system.
>
> The first interchange concerns the situation's significance as a source of consummatory goal gratification or attainment. A goal state, for an individual actor or for a social system, is a <u>relation</u> between the system of reference and one or more situational objects which (given the value system and its institutionalization) maximizes the stability of the system...
>
> The second interchange deals with the problem of controlling the environment for purposes of attaining goal states. Since relations to the situation are problematical, there arises a <u>generalized</u> interest in establishing and improving control over the situation in various respects. Of course, the pursuit of particular goal states involves such control. A different order of problem is involved, however, in the generalization of facilities for a variety of system and sub-system goals, and in activity specialized to produce such facilities. When a social system has only a simply defined goal, the provision

of facilities or the "adaptive" functions is simply an undifferentiated aspect of the process of goal attainment. But in complex systems with a plurality of goals and sub-goals, the differentiation between goal attainment and adaptive processes is often very clear.

Whatever the interacting units in a system process--motivational units of personality (need dispositions), roles of individual persons in a social system, or roles of collectivities in a more microscopic social system--the actions of the units may be mutually supportive and hence beneficial to the functioning of the system; but also they may be mutually obstructive and conflictful. The fourth functional imperative for a social system is to "maintain solidarity" in the relations between the units in the interest of effective functioning; this is the imperative of system integration.

The four fundamental system problems under which a system of action, in particular a social system, operates are thus (latent) pattern maintenance (including tension management), goal attainment, adaptation, and integration...

Any system of action can be described and its processes analyzed in terms of these four fundamental categories. The aim of analyzing a system is to assess the effects of changes in the data of the system, the situation and the properties of its units, on changes in the state of the system and the states of its component units; statements about the effects on the system and its units are framed in terms of these four dimensions. For instance, we say a system "adapts" to certain situational disturbances. Furthermore, if these categories formulate "directions" in which process can move, certain constraints prevent processes from moving equally in all directions at once, at least unless very specific conditions are fulfilled. Indeed, the idea of system itself implies such constraints.[16]

Thus, the management of performance in an educational system must provide for the continuous and systematic resolution of the four fundamental system problems described by Parsons and Smelser. These functional imperatives can be related to the functional requirements of system performance and management procedures must be compatible with the dimensions of each imperative. FIGURE 5 presents a model of system-environment relationships which includes provision for consideration of these imperatives in the performance of system functions.

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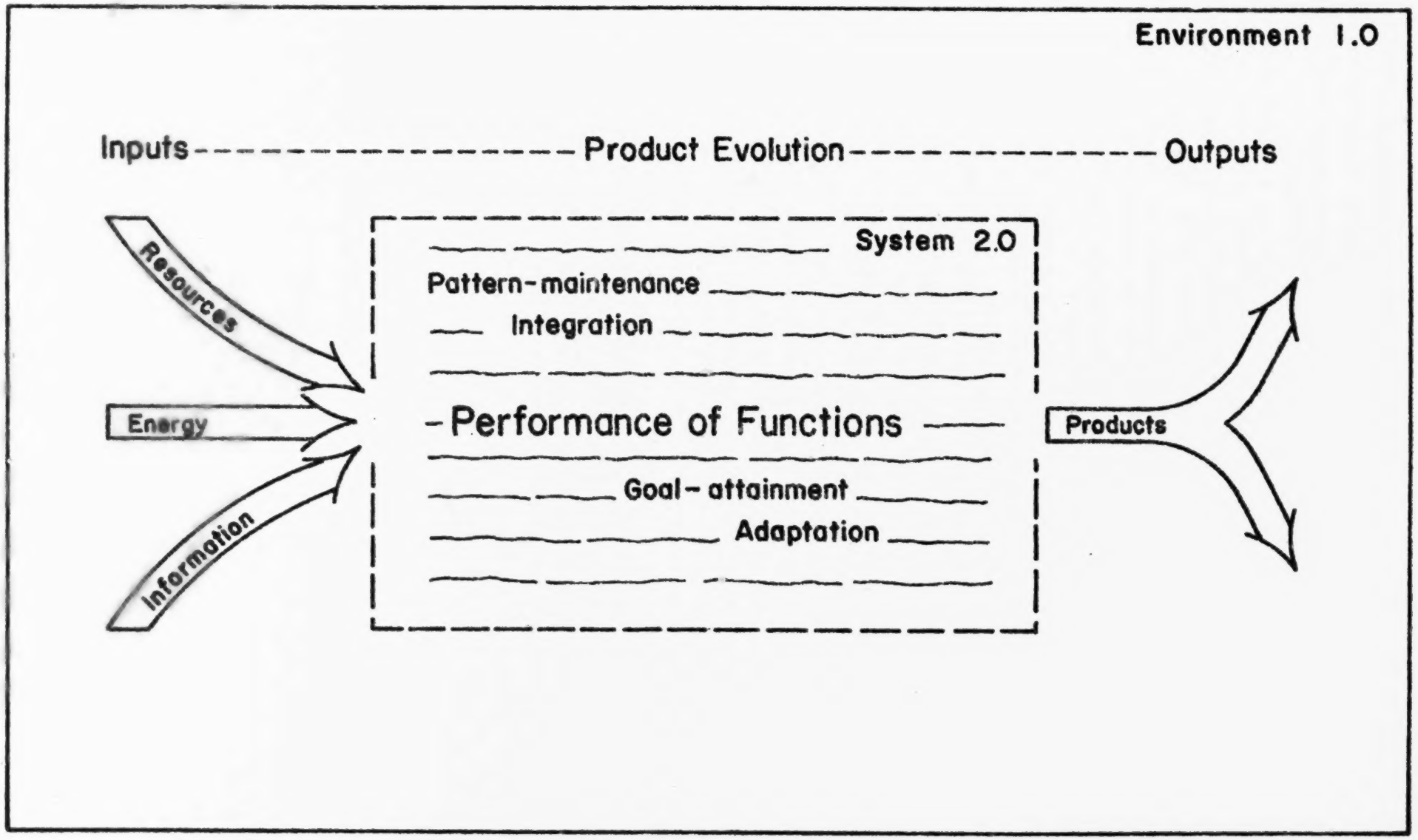
[16] Talcott Parsons and Neil J. Smelser Economy and Society (New York: The Free Press, 1956), pp. 16-19.

A Model of System-Environment Relationships

FIGURE 5



Social System-Environment Relationships

Bauer and his colleagues investigated "an issue of major importance in a society increasingly dominated by rapid technological change--The need to anticipate the consequences of that change."[17] The social system theory presented by Bauer is functionally oriented in that it can be used to analyze the dynamics of social system-environment interaction. Bauer and his colleagues clearly imply that the specification of an educational system cannot be limited to the confines of the system since interaction takes place with environmental structures existing outside its boundaries.

Gross has explained system-environment relationships as follows:

> Every social system is an open system. In other words, certain activities cut across its boundaries and connect it with its social, biological, and physical environment. The environment, in turn, is made up of other systems, social, biological, and physical.
>
> There are four kinds of boundary-crossing activities:
>
> 1. Entries and Exits. Entries into families and informal groups--and their subsystems--are determined by birth, marriage, aging, acceptance, or cooption. Entries into formal organizations--and their subsystems--are achieved by recruitment, joining, seniority, promotion, or merger. Entries into geographical entities are accomplished by birth or migration. Exits are provided by death, resignation, termination, demotion, dissolution, and emigration. The significance of entries and exits is underscored by "rites of passage." These are particularly important in formal organizations, which (their parts being infinitely replaceable) have a potentiality for immortality.
>
> 2. Multiple Membership. Most individuals play roles in different groups and organizations. These multiple roles cannot be completely segregated within the human personality. In fact, they invariably lead to role conflicts and divided loyalties. They therefore bring to one system some appreciation of the objectives and values of other systems. This is particularly true of subsystems included within larger systems.

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[17] Earl P. Stevenson in Raymond A. Bauer (ed.) Social Indicators (Cambridge, Massachusetts: The M.I.T. Press, 1966), p. vii.

3. Resource Exchange. This involves the acquisition of inputs (goods, services, or information) and the delivery of outputs (goods, services, or information that have been processed in some form) through a clientele network. Many subsystems in a large organization will receive inputs from internal suppliers and transmit outputs to internal clients. Many large organizations have input-output relationships extending across their country and the world.

4. Influence. Every system exerts a certain amount of influence (or power) beyond its boundaries and is influenced by other systems. These reciprocal influence relations (rarely balanced) take place not only with suppliers and clients but also with controllers and controllees, associates and adversaries, and miscellaneous publics--as illustrated in Chart 3.1 A system's range of operations beyond its own bases may be measured in terms of its influence and its input-output relations.

Obviously, the varying extent of these complex boundary-crossing activities results in different degrees of openness--with more highly isolated systems at one extreme, and at the other those boundaries at the point of crumbling.[18]

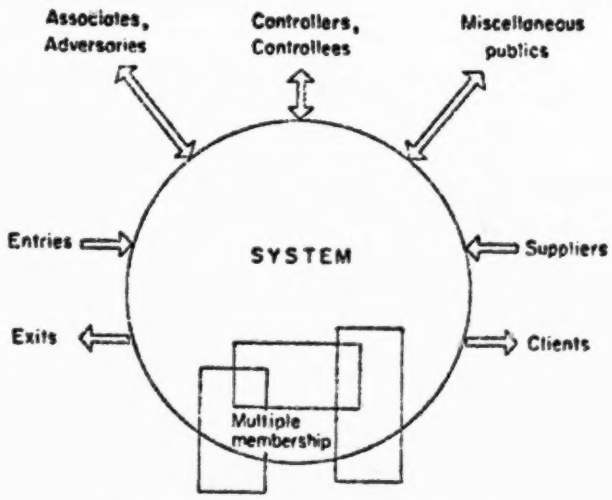

Chart 3.1. System in environment.

Another dimension in the specification of educational system-environment relationships resides in the necessity of developing a framework of concepts which can be used to explain corresponding u[illegible]s of the system and the environment. Since an educational system develops out of societal needs for services, the specification of relationships must include every aspect

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[18]Bertram M. Gross, "The State of the Nation: Social Systems Accounting" in Raymond A. Bauer (ed.) Social Indicators (Cambridge, Massachusetts: The M.I.T. Press, 1966), pp. 175-176.

of system performance in relation to the satisfaction of societal needs.

Bauer has presented a detailed rationale which provides a conceptual basis for explaining system-environment relationships. His rationale is as follows:

> Let us now go back to the commonly accepted concepts of concrete systems. These concepts are related to some set of interrelated elements in an environment. If we spell these concepts out a little more clearly, we get the following:
>
> 1. Differentiated subsystems.
> 2. Internal relations.
> 3. External relations.
>
> To deal properly with the first of these elements, we must now make four additional distinctions. First, as we look at the great variety of subsystems in a national territorial aggregate...there is some merit in distinguishing between people as individuals and people as members of informal groups and organizations. In demography, vital statistics, and other important calculations we must deal with various categories of people apart from their participation in larger subsystems.
>
> Second, we must recognize that all subsystems are intimately associated with physical, nonhuman resources. This makes all social systems man-resource systems.
>
> Third, all social systems have some kind of guidance system (or subsystem) to maintain the internal relations necessary to prevent system disintegration and to influence system performance.
>
> Fourth, all subsystems are guided by various values. In addition, there are usually some minimal values common to the social system as a whole. Hence these two merit separate attention, particularly since there are so many kinds of values and value conflicts in any national society.
>
> We thus find that our simple set of three elements is now expanded into seven interrelated elements. These may be set forth in the following proposition concerning social system structure:
>
> The structure of any social system consists of (1) people and (2) nonhuman resources (3) grouped together into subsystems that (4) interrelate among themselves and (5) with the external environment, and are subject to (6) certain values and (7) a central guidance system that may help provide the capacity for future performance.
>
> Each of these seven elements, of course, is itself multi-dimensional. Many investigators may spend decades investigating just one or two dimensions of one subelement. Any comprehensive analysis of these elements (no matter how ordered) might be regarded as a "balance sheet" that presents a system's human and institutional assets as well as its physical and financial assets.

Each element of system structure has certain spatial and temporal dimensions. The most obvious of these are the geographic extension of a society's land mass and the geographic distribution of people and critical types of nonhuman resources. There are spatial aspects, in terms of both "home base" and sphere of operations of every subsystem. All elements of system structure are located at specific points in time and tend to change over time.

The Performance Elements

The obvious starting point for analyzing system performance is the input-output concept. This, also, may be spelled out in terms of three initial elements:

1. Acquiring inputs.
2. Producing outputs for external use.
3. Investing in the system, that is, producing outputs to maintain change or increase the system's future performance.

Here again four additional distinctions are helpful.

First, there is a major difference between information developed to describe the kind, quantity, and quality of output of a system (e.g., the health services available at a hospital or the educational activities at a university) and the actual welfare, utility, or benefits generated by such services.

Second, there is considerable value in giving special attention to information on the extent of economizing on input use; that is, to various input-output relations (variously referred to as "efficiency," productivity," or profitability").

Third, an extremely important aspect of performance is the extent to which the system and its components conform to various behavioral codes (legal, moral, organizational, professional, etc.).

Finally, these aspects of performance, both separately and in combination, may be viewed in terms of information on their degree of rationality. There are advantages in dealing separately with information on this also.

Once again, for purposes of both convenience and completeness, three elements have now been expanded to seven. These may now be put together in the following proposition concerning the performance of a social system:

The performance of any social system consists of activities (1) to satisfy the interests of various "interesteds" by (2) producing various kinds, qualities, and quantities of output, (3) investing in the system's capacity for future output, (4) using inputs efficiently, (5) acquiring inputs, and doing all the above in a manner that conforms with (6) various codes of behavior and (7) varying conceptions of technical and administrative (or guidance) rationality.

Each of these elements, again, is itself composed of multidimensional subelements and sub-subelements. Any comprehensive analysis of such elements (irrespective of the ordering

> pattern) might be regarded as a system "performance statement." Indeed, it would necessarily include much of the information customarily provided in economic accounts (for either an organization or an economy) and revenue-expenditure budgets.[19]

Political System-Environment Relationships

Easton has developed a model which can be used to analyze the political relationships which exist between the educational system and its environment.[20] In addition, Easton's model serves in the elaboration of political relationships which will enable educators to develop political rationality in educational decision making.

Easton has interpreted the relationships presented in Diagram 1 as follows:

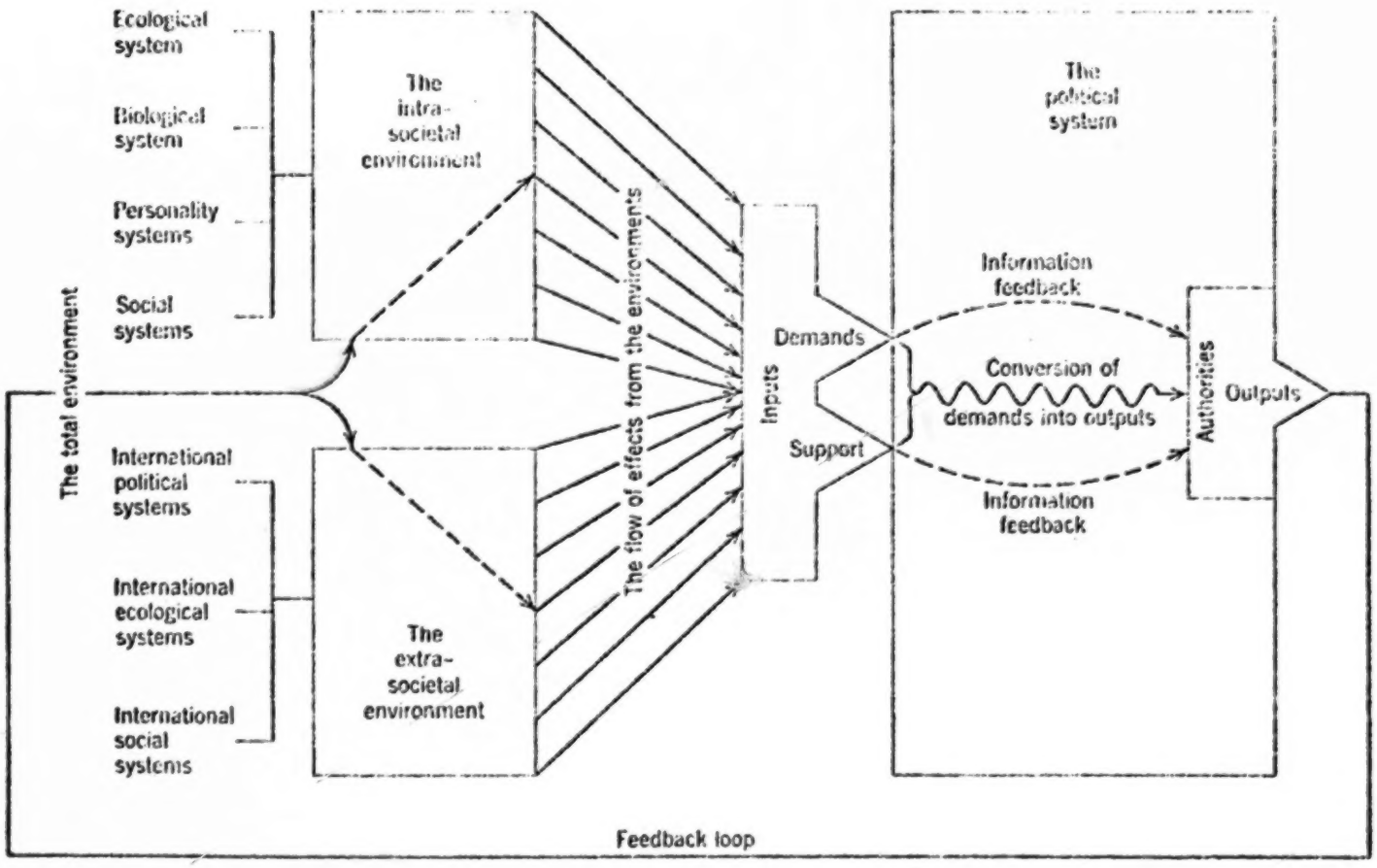

DIAGRAM 1 A DYNAMIC RESPONSE MODEL OF A POLITICAL SYSTEM

[19] Ibid., pp. 182-184.

[20] David Easton, A Systems Analysis of Political Life (New York: John Wiley and Sons, Inc., 1965).

...we begin with the fact that it shows a political system surrounded by the two classes of environments that together form its total environment. The communications of the many events that occur here are represented by the solid lines connecting the environments with the political system. The arrowheads on the lines show the direction of flow into the system. But rather than attempting to discuss each disturbance in the environment uniquely or even in selected groups or classes of types, I use as an indicator of the impact that they have on the system, the way in which they shape two special kinds of inputs into the system, demands and support. This is why the effects from the environment are shown to flow into the box labelled "inputs." We must remember, however, that even though the desire for simplicity in presentation does not permit us to show it on the diagram, events occurring within a system may also have some share in influencing the nature of the inputs.

As is apparent, the inputs provide what we may call the raw materials on which the system acts so as to produce something we are calling outputs. The way in which this is done will be described as a massive conversion process cavalierly represented on the diagram by the serpentine line within the political system. The conversion processes move toward the authorities since it is toward them that the demands are initially directed. As we shall see, demands spark the basic activities of a political system. By virture of their status in all systems, authorities have special responsibilities for converting demands into outputs.

If we were to be content with what is basically a static picture of a political system, we might be inclined to stop at this point. Indeed, much political research in effect does just this. It is concerned with exploring all those intricate subsidiary processes through which decisions are made and put into effect. This constitutes the vast corpus of political research today. Therefore, insofar as we were concerned with how influence is used in formulating and putting into effect various kinds of policies or decisions, the model to this point would be an adequate if minimal first approximation.

But the critical question that confronts political theory is not just the development of a conceptual apparatus for understanding the factors that contribute to the kinds of decisions a system makes, that is, for formulating a theory of political allocations. As I have indicated, theory needs to know how it comes about that any kind of system can persist long enough to continue to make such decisions. We need a theory of systems persistence as well. How does a system manage to deal with the stress to which it may be subjected at any time? It is for this reason that we cannot accept outputs as the terminal point either of the political processes or of our interest in them. Thus it is important to note on the diagram, that the outputs of the conversion process have the characteristic

of feeding back upon the system and shaping its subsequent behavior. Much later I shall seek to demonstrate that it is this feature together with the capacity of a system to take constructive actions that makes it possible for a system to seek to adapt or to cope with possible stress.

On the diagram, this feedback is depicted by the line that shows the effects of the outputs moving directly back to the environments. As the broken lines within the environmental boxes indicate, the effects may reshape the environment in some way; that it to say, they influence conditions and behavior there. In this way, the outputs are able to modify the influences that continue to operate on the inputs and thereby the next round of inputs themselves.

But if the authorities are to be able to take the past effect of outputs into account for their own future behavior, they must in some way be apprised of what has taken place along the feedback loop. The broken lines in the box labeled "The political system" suggest that, through the return flow of demands and support, the authorities obtain information about these possible consequences of their previous behavior. This puts the authorities in a position to take advantage of the information that has been fed back and to correct or adjust their behavior for the achievement of their goals.

It is the fact that there can be such a continuous flow of effects and information between system and environment, we shall see, that ultimately accounts for the capacity of a political system to persist in a world even of violently fluctuating changes. Without feedback and the capacity to respond to it, no system could survive for long, except by accident.[21]

In a subsequent discussion of the possible exhaustive analysis of feedback loops between the political system and the environment, Easton revealed that:

> At this preliminary stage in a theory of political systems, when we are still trying to get our general bearings, a detailed analysis of this kind cannot and need not be undertaken. It would add confusion where clarity and simplicity are desperately needed. Rather, I shall focus attention only on the systemic feedback processes, those that link the outputs of the political system considered as a unit of analysis to the inputs of support and demands and in that way back again to the initial producers of the outputs, the authorities.[22]

Thus, Easton established a focus upon the systemic feedback processes in his analysis of system-environment relationship.

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[21] Ibid., p. 29-32.

[22] Ibid., p. 376.

Easton went on to discuss the relationship between his analysis and other research in the same field. He has related that:

> Most research, within the context of decisional and organizational theory at any rate, is normative in character. What is sought is an understanding of the conditions for the effective establishment and achievement of goals, where the criteria of effectiveness may range from unspecified efficiency to a postulated welfare function or maximization of profits. In each instance in the literature where information feedback appears prominently, it acts as a mechanism to inform the decision-makers of the extent of deviation from the desired course of action. Depending upon the quality of the feedback as tested by distortion and time delays and upon their resources and skills, the decision-makers may adjust their behavior so as to increase the likelihood of attaining their objectives. However circuitous a path the effects of initial decisions may take in returning to the decision-makers, the touchstone of the analysis always is: has the decision led to the maximization of profit, the growth of the economy, the reduction of illiteracy, the increase in employment, the weakening of the enemy, or any other general or specific goal? If not, to what can this be attributed? If it is attributable to feedback processes, how can these be improved so as to contribute to the more effective attainment of the goals? The focus is on decision-makers and the role of feedback in linking the behavior of decision-makers to the desired state of affairs.[23]

Easton has explained that his purpose was to develop a general theory which would explain the persistence of political systems in a world of stability and change. His principal interest in analyzing goal-attainment structures was to determine how success or failure in goal-achievement reacts back on the input of support. He went on to explain that such a determination would enable the specification of relationships between allocative processes and the aggravation or alleviation of stress on the political system.

In keeping with his principal interest, Easton stated that:

...the critical feedback loop for us does not confine itself

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[23] Ibid., p. 379.

to the output sector of a system exclusively. It is not defined by the relationships between the authorities and their specific goals. It includes, rather, the authorities, their goals and those politically relevant members in a system must depend for its persistence over time....It is feedback that flows from the system as a whole and may return through the system to the point from which it started, spreading its effects in the system through the chain of feedback loops already described. The consequences that outputs have for the input of support will be shaped in considerable part by the extent to which information about outputs are conveyed along the feedback loop and, in an accurate and timely manner, to all those concerned with the outputs. It will also be affected decisively by the manner in which the members who form the links in the feedback loop respond and react to this information.

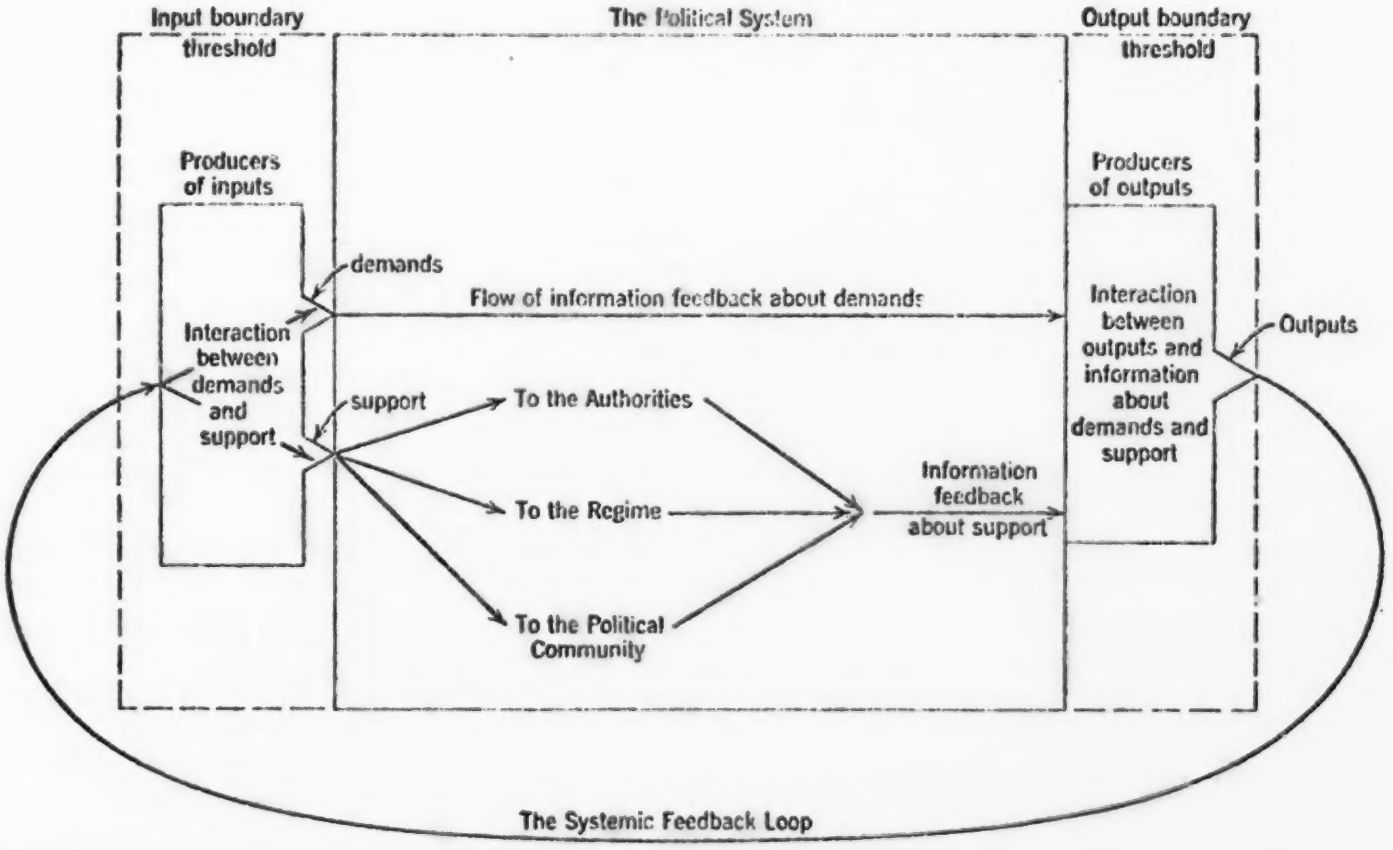

DIAGRAM 6 THE SYSTEMIC FEEDBACK LOOP

The systemic loop may be conveniently analyzed into three components or structural elements, each of which will merit some special consideration if we are to explore the various factors that constitute the "feedback function" in the mathematical sense. If we begin with the outputs and their outcomes we shall find that these provide the stimuli for the members of the system, the behaving units whom they may affect or may be perceived to affect. We view the members at the input threshold of the system, as indicated on Diagram 6.

These members may then respond to the stimuli by modifying their demands and varying their support for one or more of the basic political objects. We shall discover that it is here that outputs and inputs of both demands and support become dynamically inter-related. In continuation of the feedback flow, directly or indirectly the members communicate their sentiments to the authorities, another set of behaving units who were initially responsible for the outputs or who choose to do something further about these outputs. Finally, these authorities may then react to the response by follow-up outputs and this reaction may be considered the start of another cycle in the flow of effects and information along the systemic feedback loop.

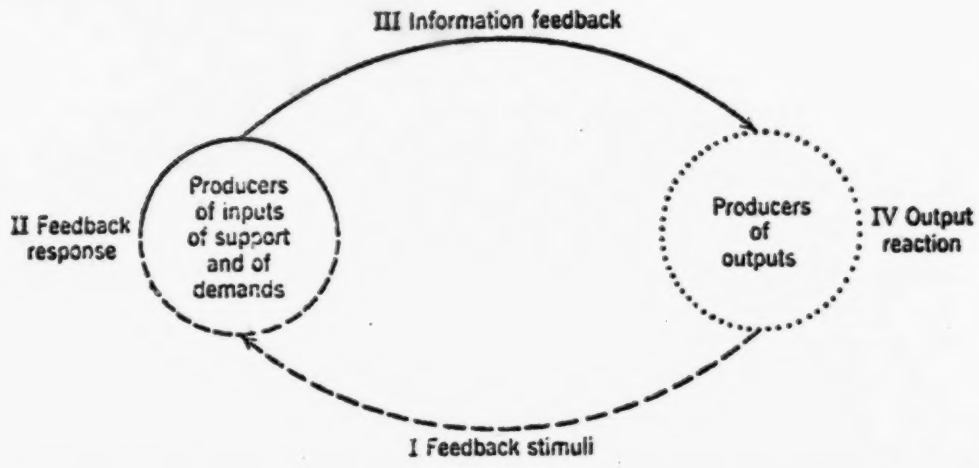

DIAGRAM 7 THE FOUR PHASES OF THE SYSTEMIC FEEDBACK LOOP

In brief, the relevant phases, in one complete cycle around a feedback loop, that would be vital in any feedback function, are four in number: the outputs and outcomes as stimuli, the feedback response, the information feedback, in the strict sense, about the response, and the output reaction to the feedback response. We shall also be concerned with the relationship among these four sets of processes together with the behaving units that they affect. We shall examine each of these processes in turn. They represent modes of interaction between the units producing outputs, the authorities, and those varied units that produce inputs both of support and demands. These four phases are outlined on Diagram 7 and they correspond to and set out more simply the feedback loop as depicted in Diagram 6.[24]

The theoretical constructs presented in this section offers many implications for educational planning and management. The elaboration of social,

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[24] Ibid., pp. 380-381.

economic and political system-environment relationships serves to enhance and explain basic educational system-environment relationships.

IV. ORGANIZATION OF THE EDUCATIONAL SYSTEM IN CALIFORNIA

Formulation of the educational system in California took place in a political context. The political system in California government specifies educational goals for the system. FIGURE 6 reveals the structure of state government for education in California. The electorate of California are thus revealed to have fundamental authority in deciding the course of education. Thus, education is a fundamental political problem and educators must develop a political rationale for decision making.

Every educational problem can be regarded as having social, economic and political elements. There are many opinions as to which of these elements are primary, if any. Wildavsky has stressed the need to balance economic rationality with political rationality.[25] He went on to advocate the development of political rationality in decision making. He supported his position using selected quotations from Diesing as follows:

> ...the political problem is always basic and prior to the others....This means that any suggested course of action must be evaluated first by its effects on the political structure. A course of action which corrects economic or social deficiencies but increases political difficulties must be rejected, while an action which contributes to political improvement is desirable even if it is not entirely sound from an economic or social standpoint.[26]

Wildavsky stressed how Diesing had pointed out the need for developing political rationality in decision making:

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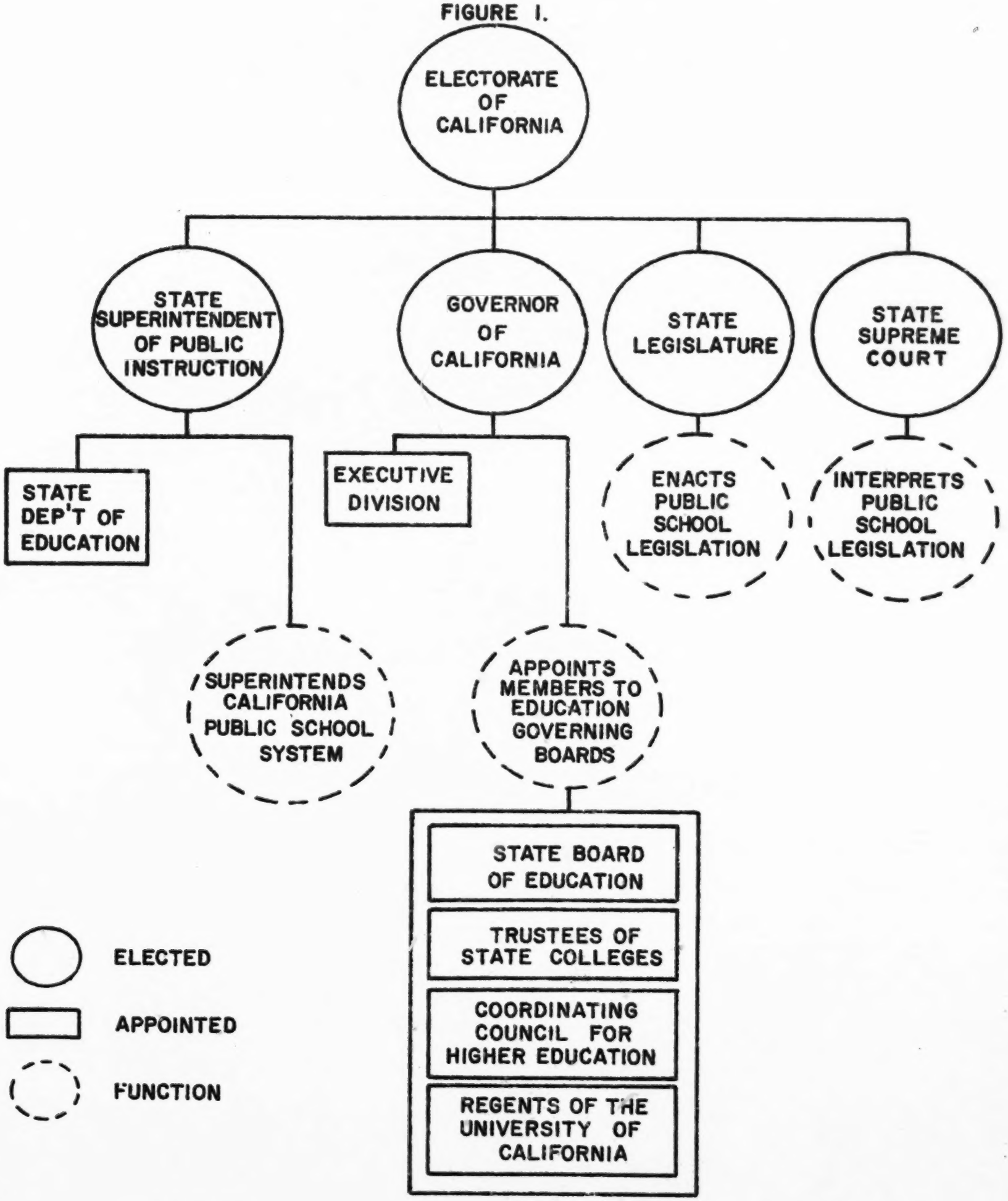
[25]Aaron Wildavsky, "The Political Economy of Efficiency: Cost-Benefit Analysis, Systems Analysis, and Program Budgeting," Public Administration Review (December, 1966), pp. 292-310.

[26]Ibid., p. 308.

STRUCTURE OF STATE GOVERNMENT FOR EDUCATION IN CALIFORNIA

FIGURE 6

FIGURE I.



> Political rationality is the fundamental kind of reason, because it deals with the preservation and improvement of decision structures, and decision structures are the source of all decisions. Unless a decision structure exists, no reasoning and no decisions are possible....There can be no conflict between political rationality and...technical, legal, social, or economic rationality, because the solution of political problems makes possible an attack on any other problem, while a serious political deficiency can prevent or undo all other problem solving....Non-political decisions are reached by considering a problem in its own terms, and by evaluating proposals according to how well they solve the problem. The best available proposal should be accepted regardless of who makes it or who opposes it, and a faulty proposal should be rejected or improved no matter who makes it. Compromise is always irrational; the rational procedure is to determine which proposal is the best, and to accept it. In a political decision, on the other hand, action never is based on the merits of a proposal but always on who makes it and who opposes it. Action should be designed to avoid complete identification with any proposal and any point of view, no matter how good or how popular it might be. The best available proposal should never be accepted just because it is best; it should be deferred, objected to, discussed, until major opposition disappears. Compromise is always an irrational procedure, even when the compromise is between a good and a bad proposal.[27]

FIGURE 7 reveals the relationships between the executive division of government and education in California. Political rationality in educational decision making predicates that educational management cannot proceed independent of management in other sectors of government. Political decisions relative to education are made at the policy making level of organization and, once made, are transmitted throughout the organizational structure of the educational system.

The organizational structure of education in California may be outlined as follows:

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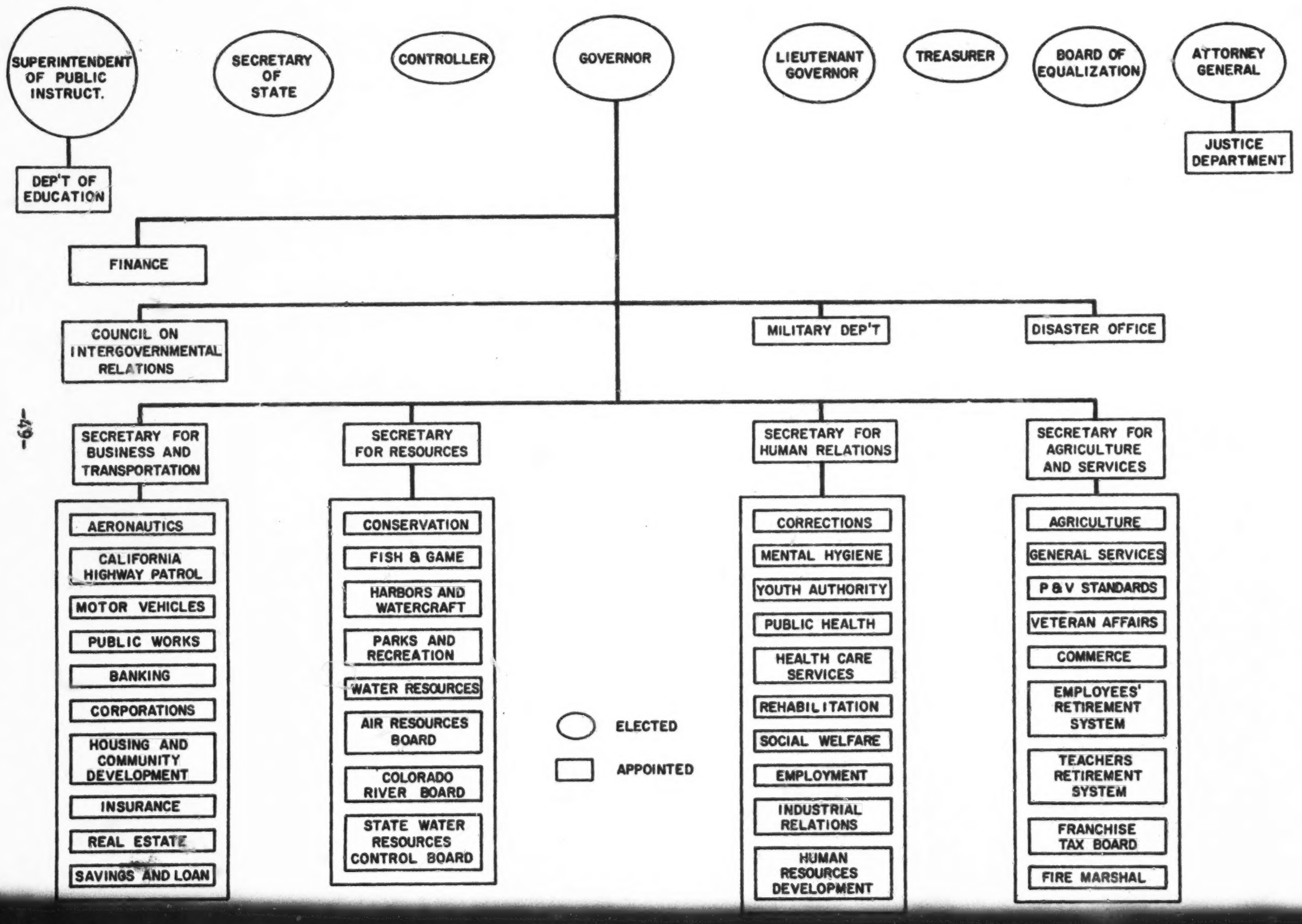
[27] Ibid., p. 307.

THE RELATION OF THE EXECUTIVE DIVISION OF GOVERNMENT TO EDUCATION IN CALIFORNIA

FIGURE 7



I. Policy-Making Level of Organization

California State Legislature
California State Board of Education
County Boards of Education
Local School District Boards of Education
Coordinating Council for Higher Education
Regents of the University of California
Trustees of the State Colleges

II. Management Level of Organization

California State Superintendent of Public Instruction
California County Superintendents of Schools
District Superintendents of Schools
Chancellor of the University of California
President of the State Colleges in California

III. Administration Level of Organization

California State Department of Education
Offices of the County Superintendents of Schools
Local Educational Agencies
The University of California (Individual Campuses)
State Colleges

IV. Operation Level of Organization

Management Support Services
Operation and Maintenance Services
Personnel Services
Instructional Services
Accounting and Legal Services
Pupil Personnel Services
Research and Development Services

V. Performance Units

Students	Calculators
Instructors	Computers
Administrators	Data Processing Equipment
Managers	Television Equipment
Policy Makers	Projectors
Counselors	Recorders
Consultants	Duplicators

The California State Department of Education is the primary agency for the administration of educational programs in California. The organization of this agency is presented in APPENDIX A. Pages 10 and 11 of

APPENDIX A reveal specially funded projects which have been created within the California State Department of Education to perform specialized functions.

Arthur D. Little, Inc., has proposed that a cycle of developmental planning be developed in California. Since the proposed cycle of developmental planning serves by relating the California State Department of Education to local school districts and intermediate units in California, an explanation of the cycle is useful. The Little report explains the cycle as follows:

> "In the upper right-hand corner of the chart (1), we show but a few of the many kinds of influences which are broadly shaping educational programs throughout the nation. These include the activities of universities, research bureaus, curriculum development projects, the opinion and suggestions of scholars and eminent educators, and the influences of the Federal government and of organized professional and lay groups. We have proposed that a Bureau of Educational Reference (2) can represent a focal point within the Department of Education for the compilation of the output from these varied sources of advanced concepts, programs, and technological developments within specific curriculum areas. We have also urged that the intermediate unit or county superintendent of schools (3) can valuably serve as a regional agency to encourage planning for educational development within districts and to assist and coordinate district development programs. As districts evaluate alternative opportunities and settle upon specific plans and priorities (4), the intermediate unit is in an excellent position to consolidate information concerning the kinds of opportunities and problems that are emerging with particular clarity at the local level (5).
>
> Within the State Department of Education, the proposed Bureau of Educational Evaluations works closely with intermediate units to develop methods for the evaluation of local programs (both experimental and standard) and to compile information (6) useful to the State Board of Education in its effort to be aware of the need for State level action. The Board performs a continuing planning function. In this process, it receives information from a variety of sources concerning the appropriate content for the State's developmental plan (7). From time to time, the Board may feel the need for additional studies as a basis for planning (8).

When the issues under consideration are of major significance, the Board may direct that an *ad hoc* project team be created for the purpose of assessing the extent and kind of State action that is indicated (9). If appropriate resources for such an assessment are deemed to exist within the permanent staff of the Department, the Bureau of Educational Evaluations and the Bureau of Educational Reference may collaborate on the assessment (9a) as an alternative to the formation of an *ad hoc* project team.

Working from staff studies performed by the Department of Education, the State Board reviews its plan for educational development and the priorities that have been assigned to elements of the plan (10). Periodically, the Board reissues its revised plan. As a part of such a plan, the Board may call for the formation of an *ad hoc* project team (11) for the purpose of carrying out a specific element of the developmental plan (e.g., to seek and apply new concepts to the teaching of remedial reading at the elementary level). The Bureau of Educational Evaluations is available as a staff resource for use by such a project team (11a).

Curricular changes, new courses of study, new instructional materials, and recommendations for textbook adoptions are a few of the tangible outputs from the project team. When appropriate, these are reviewed and approved by the State Board of Education (12). The Bureau of Educational Reference (13), working indirectly through its publications and directly with the offices of county superintendents (14), disseminates information about the State developmental plan and about the accomplishments of various programs of action growing out of the plan. This information begins to influence local planning (15). In the meantime, other influences continue to operate on the local district, and new opportunities and new problems emerge to demand attention from local administrators. The programs and priorities contained within district plans for educational development are modified accordingly. The cycle is again at the point represented by step (5) in the chart and proceeds to repeat the steps that have been outlined above.[28]

Arthur D. Little, Inc. submitted a second report to the California State Board of Education in May, 1967. The recommendations presented in this report centered upon reorganization of the State Department of Education.

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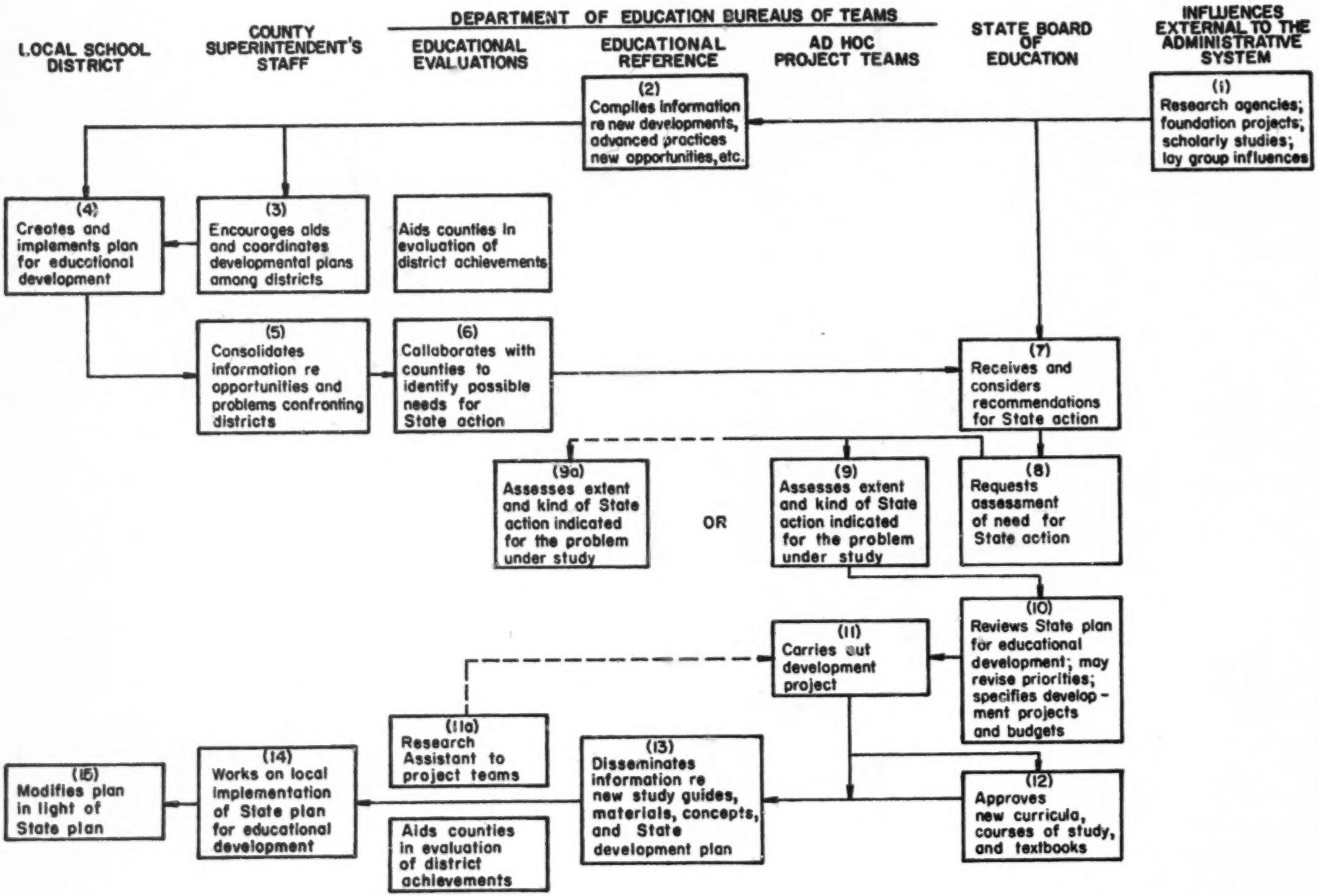
[28]Arthur D. Little, Inc., *The Emerging Requirements for Effective Leadership for California Education* (Sacramento, California: The California State Department of Education, 1964), pp. 66-68.

Flow Chart of a Proposed Educational Development Planning Process for California *

FIGURE 8


LOCAL SCHOOL DISTRICT
COUNTY SUPERINTENDENT'S STAFF
DEPARTMENT OF EDUCATION BUREAUS OF TEAMS
EDUCATIONAL EVALUATIONS
EDUCATIONAL REFERENCE
AD HOC PROJECT TEAMS
STATE BOARD OF EDUCATION
INFLUENCES EXTERNAL TO THE ADMINISTRATIVE SYSTEM
(1) Research agencies; foundation projects; scholarly studies; lay group influences
(2) Compiles information re new developments, advanced practices new opportunities, etc.
(3) Encourages aids and coordinates developmental plans among districts
Aids counties in evaluation of district achievements
(4) Creates and implements plan for educational development
(5) Consolidates information re opportunities and problems confronting districts
(6) Collaborates with counties to identify possible needs for State action
(7) Receives and considers recommendations for State action
(8) Requests assessment of need for State action
(9) Assesses extent and kind of State action indicated for the problem under study
OR
(9a) Assesses extent and kind of State action indicated for the problem under study
(10) Reviews State plan for educational development; may revise priorities; specifies development projects and budgets
(11) Carries out development project
(11a) Research Assistant to project teams
(12) Approves new curricula, courses of study, and textbooks
(13) Disseminates information re new study guides, materials, concepts, and State development plan
(14) Works on local implementation of State plan for educational development
Aids counties in evaluation of district achievements
(15) Modifies plan in light of State plan

* Arthur D. Little, Inc. The Emerging Requirements for Effective Leadership for California Education.

The role of the intermediate unit of educational organization in California has been constructively described by "The Committee of Ten".[29] The first conclusion reached by the Committee was stated as:

> It is essential in California that there be an intermediate unit operating between the individual school districts and the State Department of Education. In many instances it is the function of the intermediate unit to carry out the state's role and responsibility in public education. Its major function, however, is to serve as a coordinating and regional service agency for local districts....[29]

An analysis of the complete document is recommended for those readers who wish to secure additional information concerning the intermediate units of organization.

A school district plan of organization is presented as FIGURE 9. This plan of organization was developed in collaboration with participants in OPERATION PEP. This plan provides for the areas of concern which must be considered in planning and managing educational endeavors. These concerns may be analyzed using the relationships presented in FIGURE 4. A more complete description of FIGURES 4 and 9 are presented in the document titled, A School District Plan of Functional Organization.

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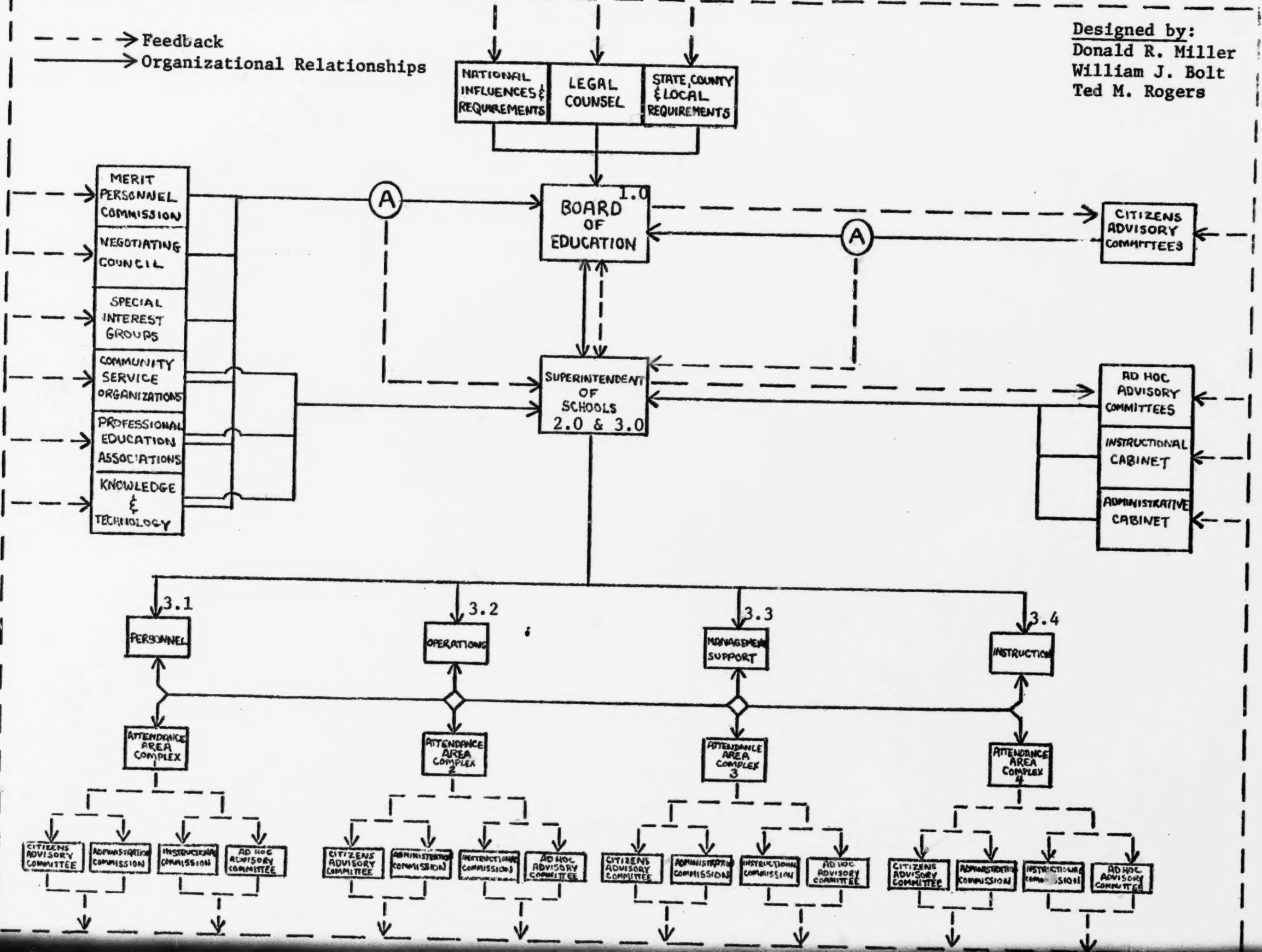
[29]The Committee of Ten The Future of the Intermediate Unit in California (Visalia, California: American Yearbook Company, 1966), p. 1. This publication was sponsored by the California Association of County Superintendents of Schools and the County Boards of Education Section of the California School Boards Association

SCHOOL DISTRICT PLAN OF ORGANIZATION FIGURE 9



V. RECOMMENDATION

The resolution of complex culturally-based problems is a difficult process due to the nature of the problems and the patterns of human involvement required to successfully resolve them. Since an educational system has its beginning and end with people, educational decision-making and problem-solving processes are marked by negotiation and compromise. Thus, there is often little security for the professional educator participating in such processes.

The system approach to educational planning and management offers several "real time" benefits to educators who adopt its methodology. Adoption of the system approach is recommended because it established a principal focus upon the educational system as a whole and, thereby, it has been found to allow managers to:

1. Decrease the period of time required to formulate an accurate response.

2. Increase the number of variables which could be treated in a response.

3. Increase the rate of response.

4. Improve the quality of response.

5. Provide assurance as to the effectiveness of the response in resolving the problem.

Educational planners and managers are encouraged to read and analyze the content presented in the following OPERATION PEP training documents:

1. Developing an Operational Philosophy of Education.

2. Planned Change in Education. EA 001 608

3. Planning, Developing and Implementing Title III, ESEA Projects. EA 001 605

4. <u>A School District Plan of Functional Organization</u>. EA 001 609

Each document presents descriptions of fundamental components and collectively constitute a unit of reference for a system approach to educational planning and management.

Success and security in educational management depends upon a thorough understanding of the contextual aspects of educational performance. In addition, managers must develop a basic understanding of system-environment interaction. Finally, they must seek realistic answers for the following questions:

1. What dominant values must I serve as I plan and manage educational functions?

2. What operational philosophy can I structure for use as a guidance mechanism in planning and managing educational functions?

3. What hierarchy of criteria must I formulate in order that I may judge the effectiveness of my actions?

APPENDIX A

ORGANIZATION CHARTS OF THE CALIFORNIA STATE DEPARTMENT OF EDUCATION

ORGANIZATION CHARTS

OF THE

CALIFORNIA STATE DEPARTMENT OF EDUCATION

CHIEF ADMINISTRATIVE OFFICERS

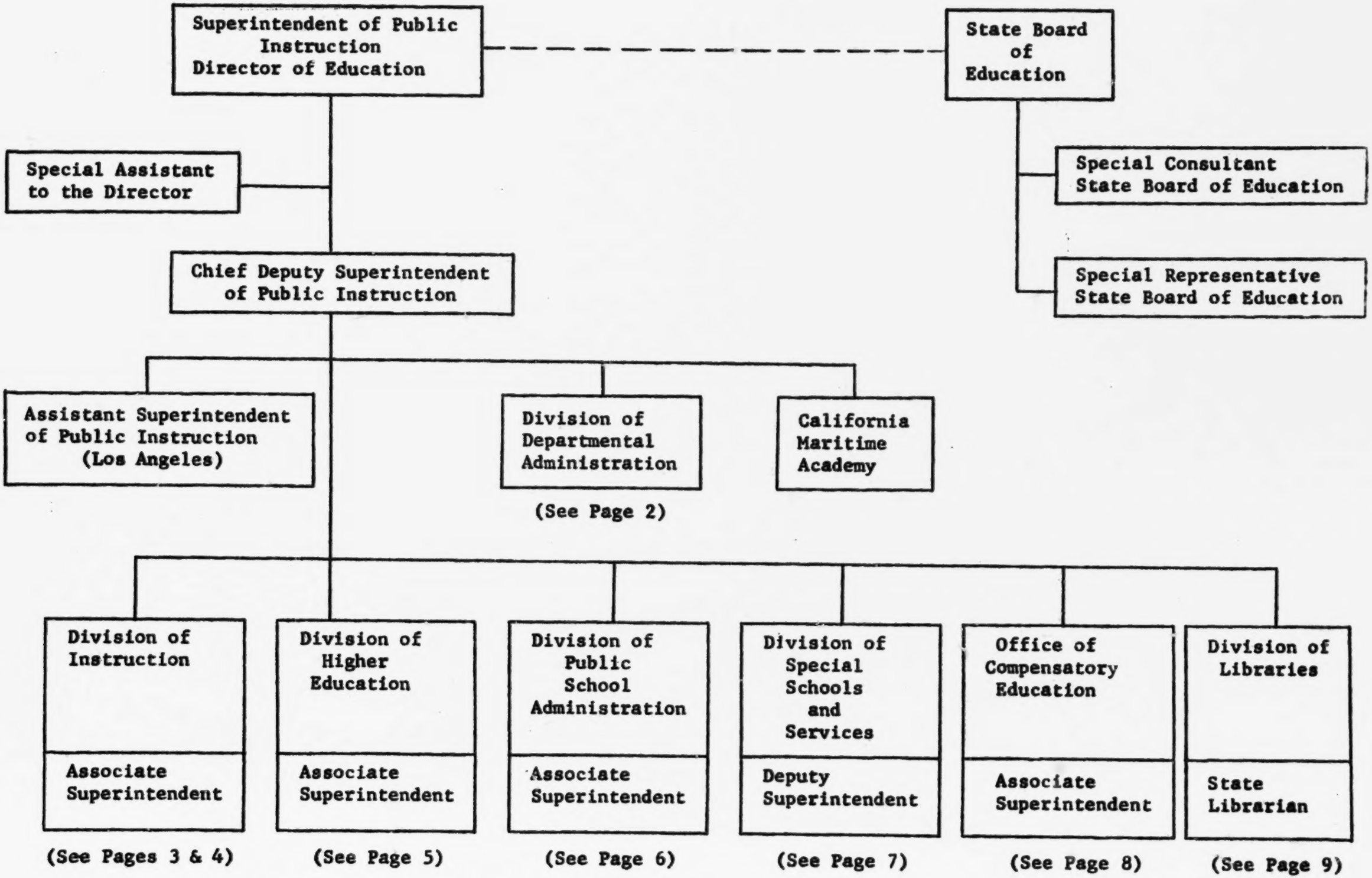
MAJOR ORGANIZATIONAL UNITS

AND

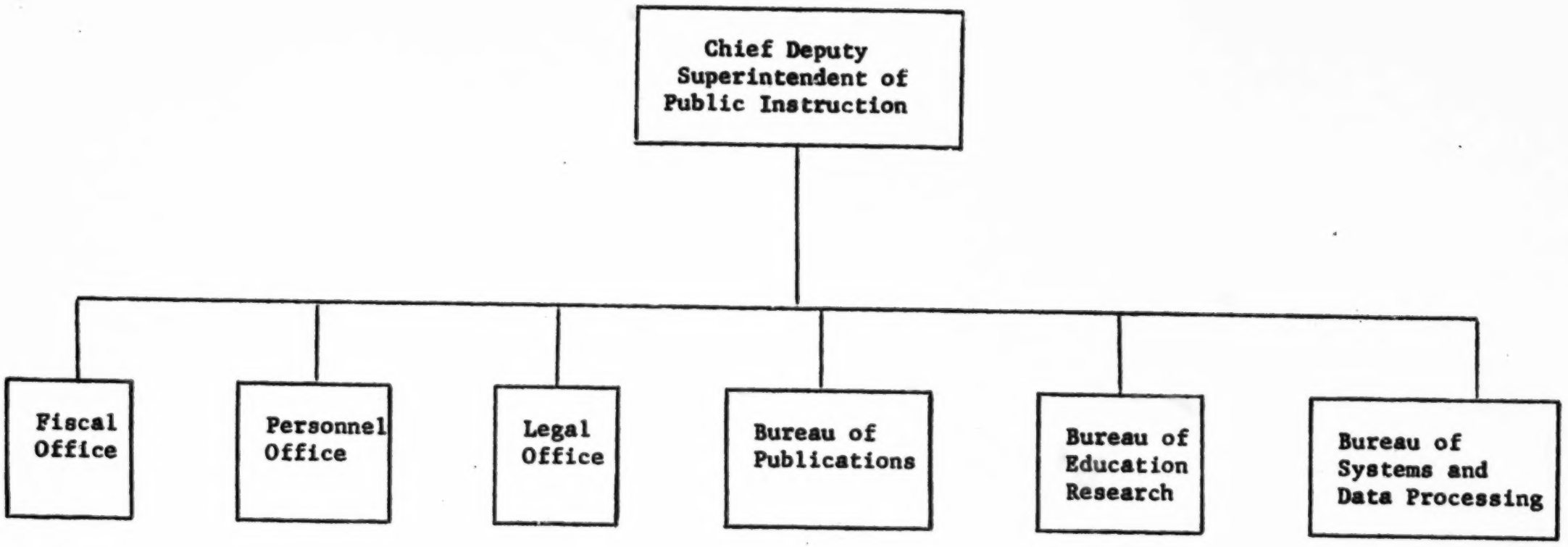
LISTING OF SPECIALLY FUNDED PROJECT UNITS

Prepared by
Personnel and Training Office
July 1967

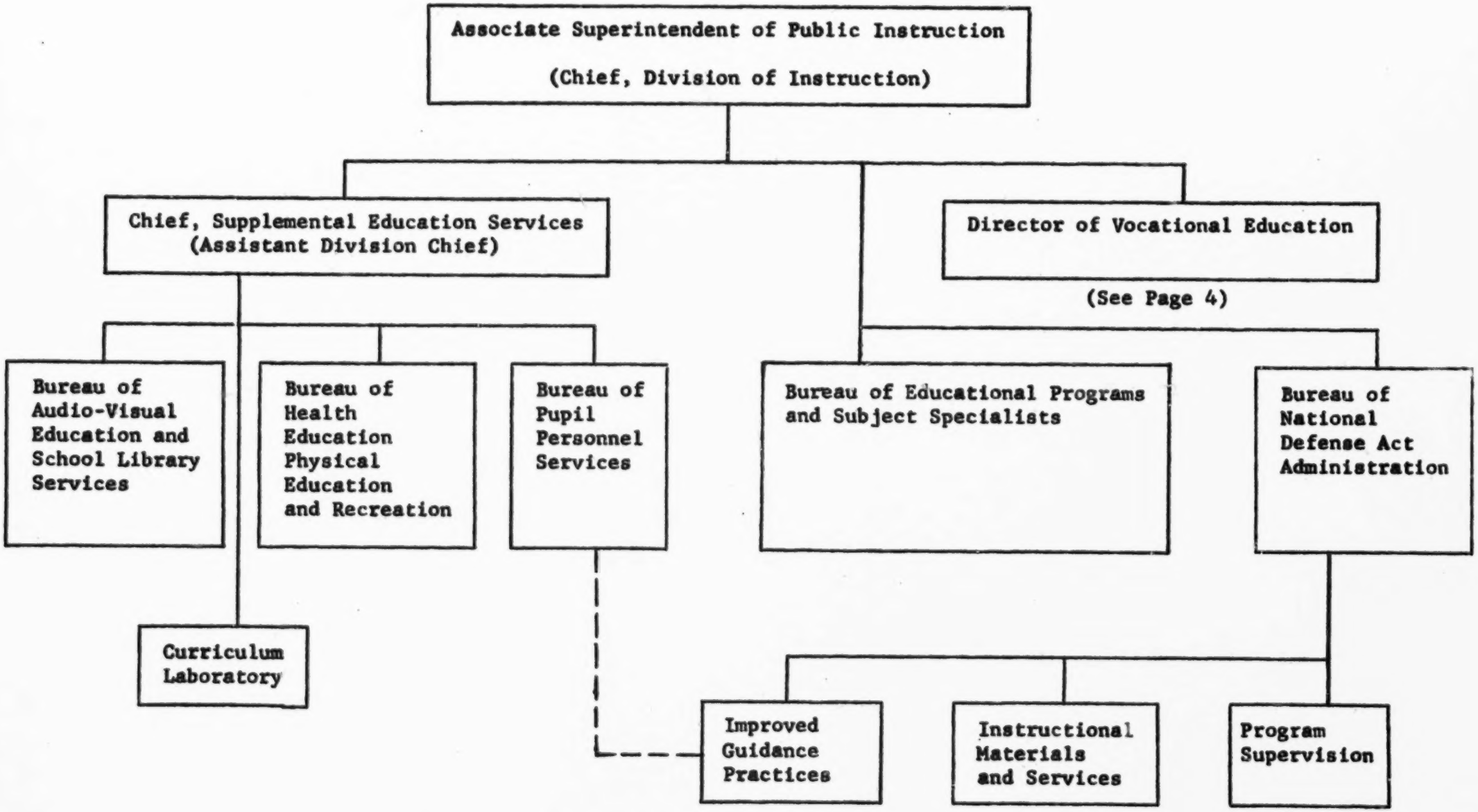
CALIFORNIA STATE DEPARTMENT OF EDUCATION



DIVISION OF DEPARTMENTAL ADMINISTRATION

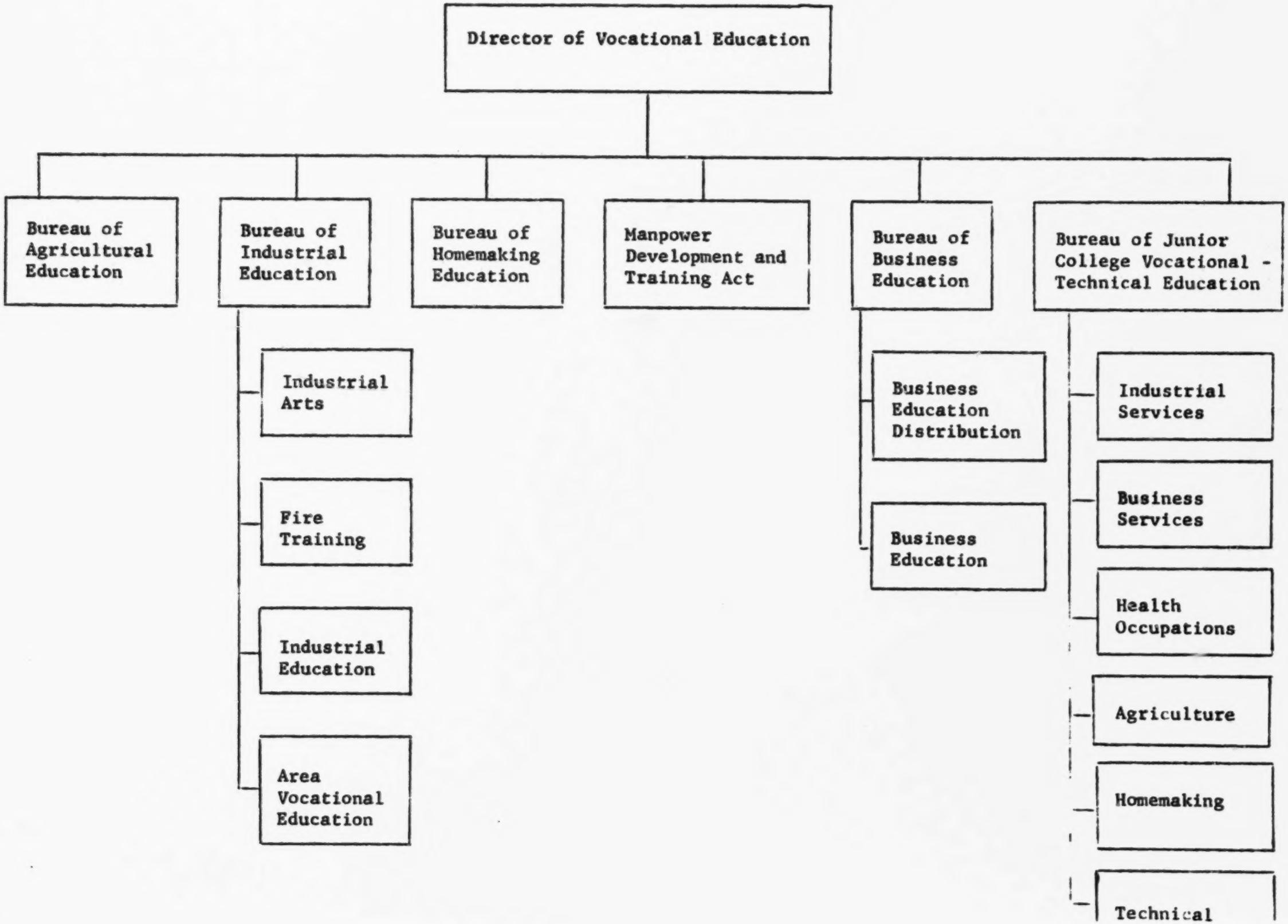


DIVISION OF INSTRUCTION

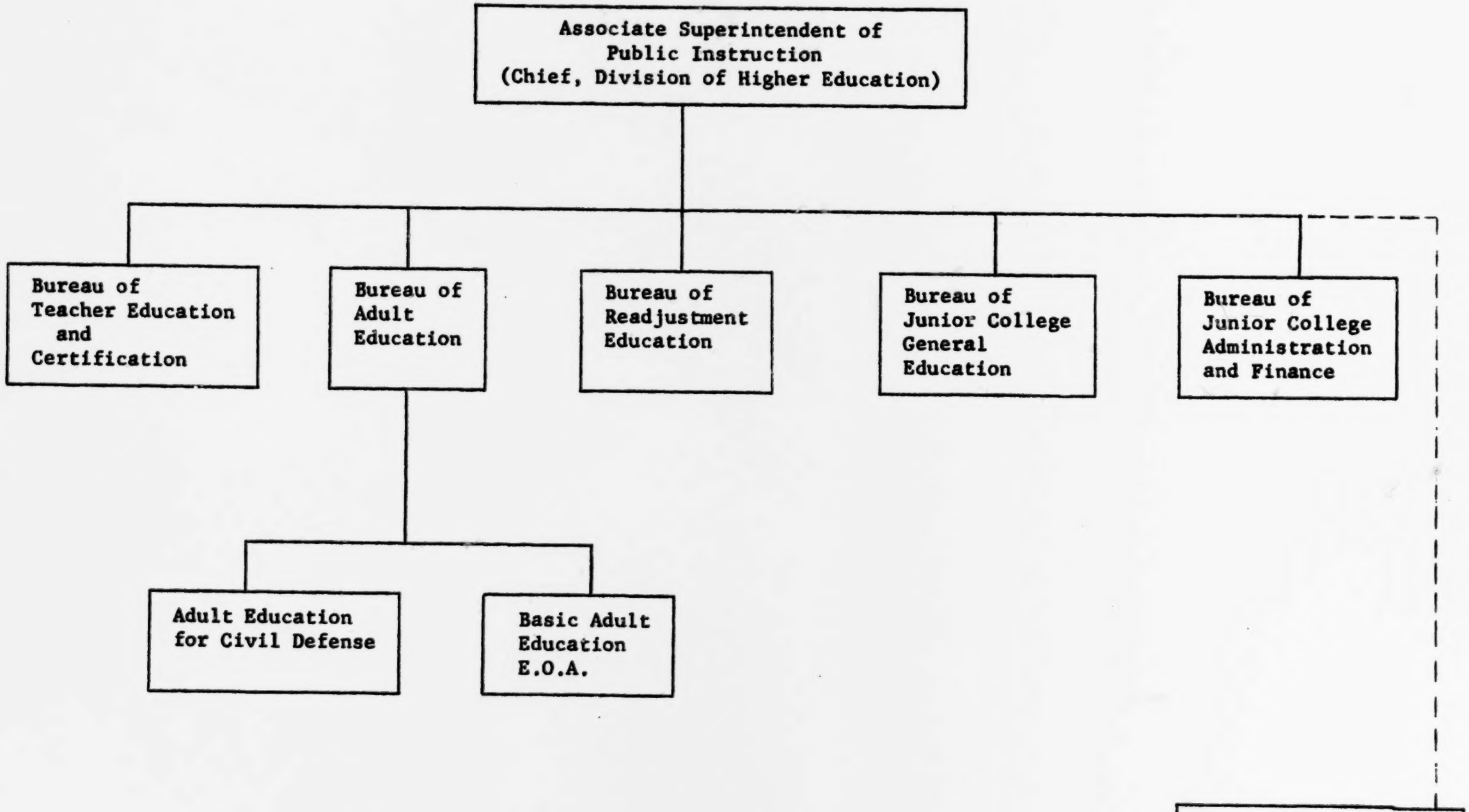

Associate Superintendent of Public Instruction
(Chief, Division of Instruction)
Chief, Supplemental Education Services
(Assistant Division Chief)
Director of Vocational Education
(See Page 4)
Bureau of Audio-Visual Education and School Library Services
Bureau of Health Education Physical Education and Recreation
Bureau of Pupil Personnel Services
Bureau of Educational Programs and Subject Specialists
Bureau of National Defense Act Administration
Curriculum Laboratory
Improved Guidance Practices
Instructional Materials and Services
Program Supervision

DIVISION OF INSTRUCTION

VOCATIONAL EDUCATION

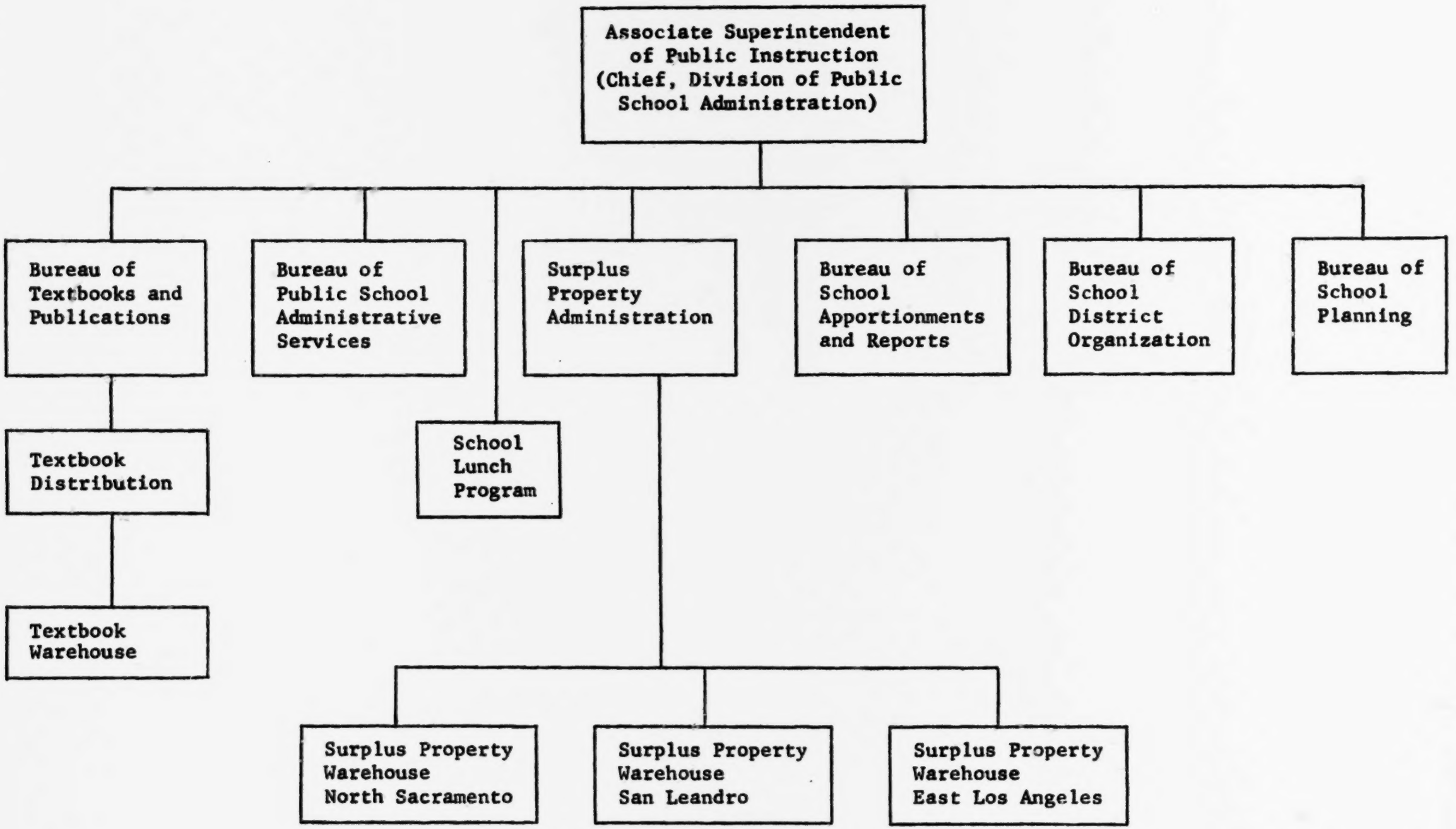


DIVISION OF HIGHER EDUCATION

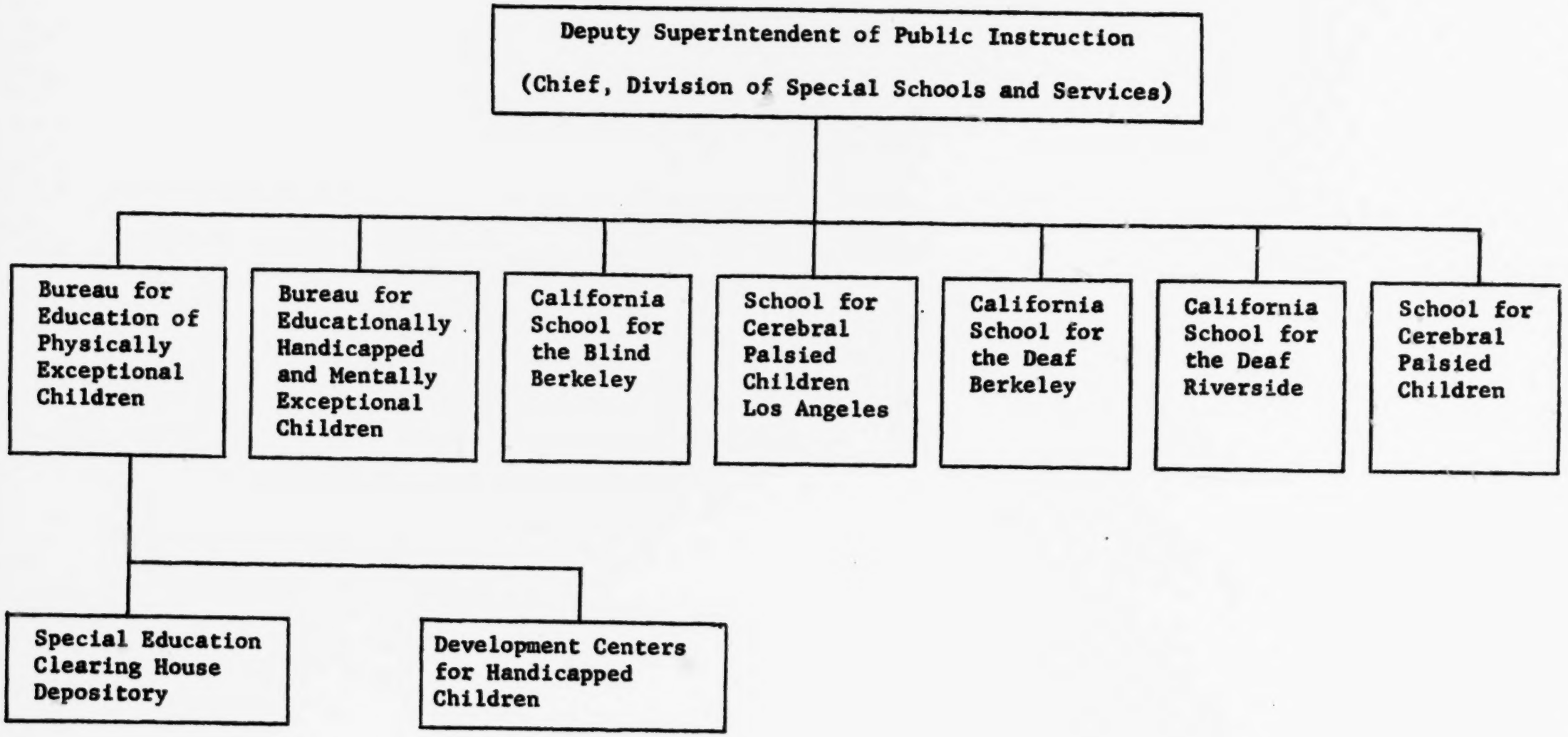

Associate Superintendent of Public Instruction (Chief, Division of Higher Education)
Bureau of Teacher Education and Certification
Bureau of Adult Education
Bureau of Readjustment Education
Bureau of Junior College General Education
Bureau of Junior College Administration and Finance
Adult Education for Civil Defense
Basic Adult Education E.O.A.
Bureau of Junior College Vocational - Technical Education

(See Page 4)

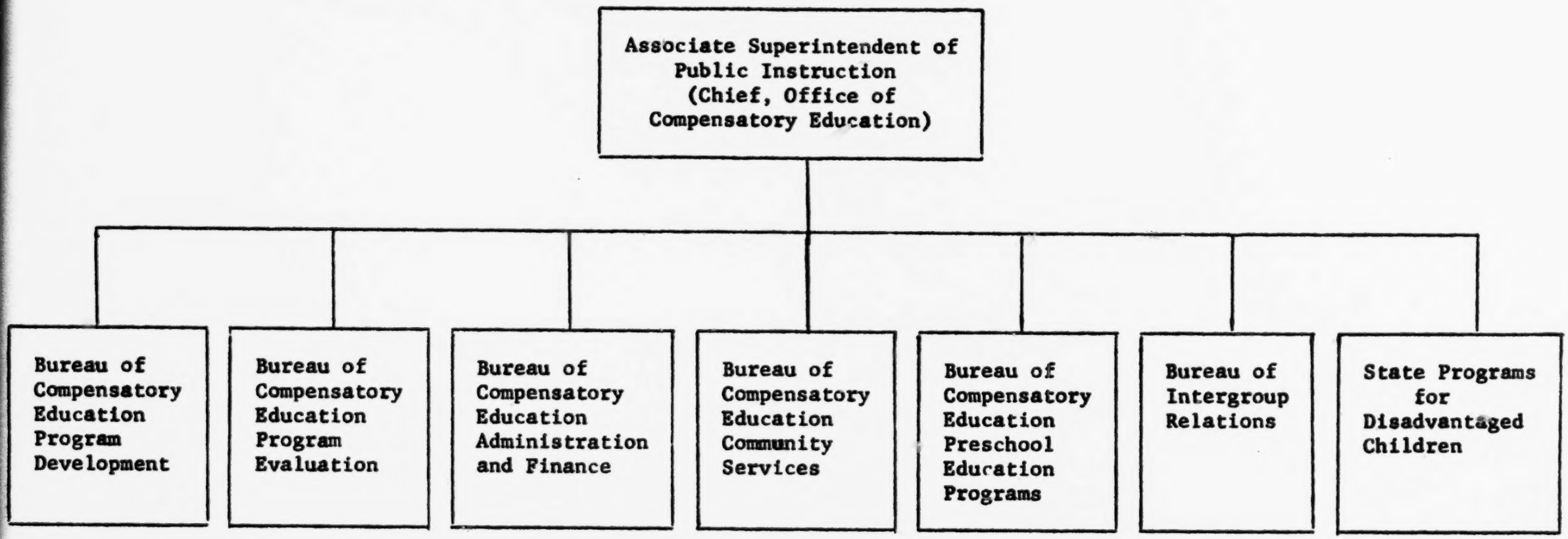
DIVISION OF PUBLIC SCHOOL ADMINISTRATION


Associate Superintendent of Public Instruction (Chief, Division of Public School Administration)
Bureau of Textbooks and Publications
Bureau of Public School Administrative Services
Surplus Property Administration
Bureau of School Apportionments and Reports
Bureau of School District Organization
Bureau of School Planning
Textbook Distribution
School Lunch Program
Textbook Warehouse
Surplus Property Warehouse North Sacramento
Surplus Property Warehouse San Leandro
Surplus Property Warehouse East Los Angeles

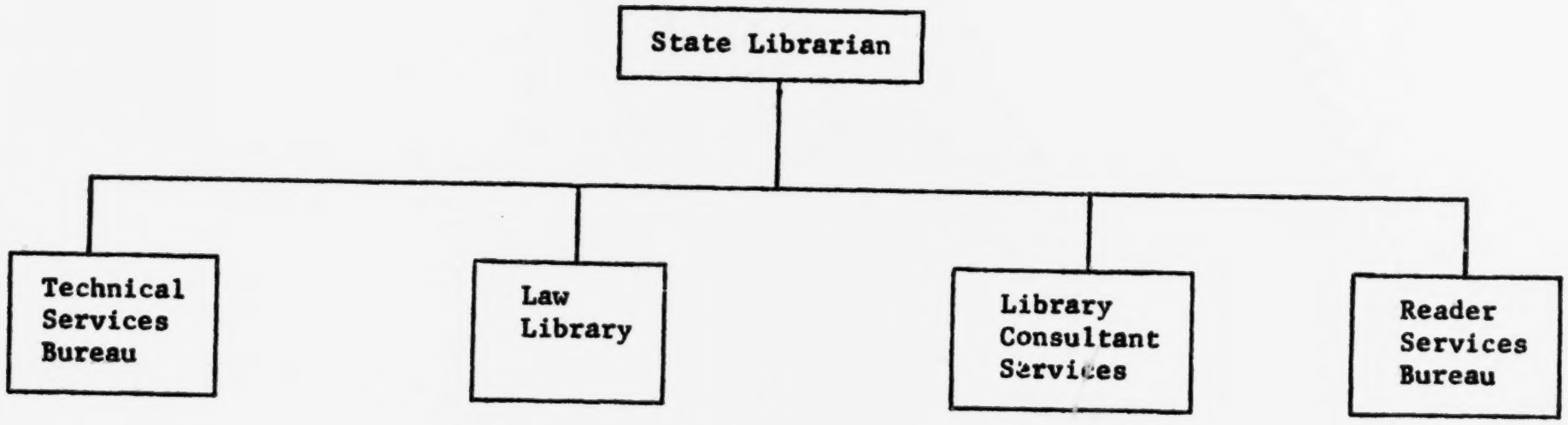
DIVISION OF SPECIAL SCHOOLS AND SERVICES


Deputy Superintendent of Public Instruction
(Chief, Division of Special Schools and Services)
Bureau for Education of Physically Exceptional Children
Bureau for Educationally Handicapped and Mentally Exceptional Children
California School for the Blind Berkeley
School for Cerebral Palsied Children Los Angeles
California School for the Deaf Berkeley
California School for the Deaf Riverside
School for Cerebral Palsied Children
Special Education Clearing House Depository
Development Centers for Handicapped Children

OFFICE OF COMPENSATORY EDUCATION


Associate Superintendent of Public Instruction (Chief, Office of Compensatory Education)
Bureau of Compensatory Education Program Development
Bureau of Compensatory Education Program Evaluation
Bureau of Compensatory Education Administration and Finance
Bureau of Compensatory Education Community Services
Bureau of Compensatory Education Preschool Education Programs
Bureau of Intergroup Relations
State Programs for Disadvantaged Children

STATE LIBRARY



STATE DEPARTMENT OF EDUCATION -- SPECIALLY FUNDED PROJECT UNITS

DIVISION	BUREAU OR OFFICE	UNIT TITLE	SOURCE OF FUNDS
State Board of Ed.	----	State Committee on Public Education	ESEA Title V
Dept. Administration	Asst. Supt. - L.A.	Education of Mexican American Children	ESEA Title V
" "	Asst. Supt. - L.A.	Farm Migrant Project	ESEA Title V
" "	Chief Deputy Supt.	Personnel Management Project	ESEA Title V
" "	Fiscal Office	ESEA Fiscal	ESEA Title V
" "	Personnel Office	In-Service Training of Staff	ESEA Title V
" "	Bureau of Publications	ESEA Publications	ESEA Title V
" "	Bureau of Ed. Research	Division of Instruction - State Servi[illegible]	NDEA Title X
	Bureau of Systems & Data Processing	Data Processing	ESEA Title V
" "	Chief, Deputy Supt.	Educational Data Processing Project	State General Fund
Instruction	Chief of Division	Advance Placement Program	ESEA Title V
"	Chief of Division	ESEA Program Planning and Development	ESEA Title V
"	Elementary Education	Bill of Rights Project	Private Funds
"	Elementary Education	ESEA Bill of Rights Project	ESEA Title V
"	Secondary Education	California Junior High School Programs	ESEA Title V
"	Secondary Education	Curriculum Framework in English	ESEA Title V
"	Secondary Education	Curriculum Framework in the Social Sciences	ESEA Title V
"	Secondary Education	Curriculum Framework in Science	ESEA Title V
	Secondary Education	Study of Elements Essential to Expanding Economic Education in Calif. Public Schools	ESEA Title V
"	Secondary Education	Study of Arts & Humanities Ed.	ESEA Title V
"	Secondary Education	Development of a Plan for Conservation Ed.	ESEA Title V
"	Bureau of NDEA Admin.	School Library Resources-Administration	ESEA Title II
	Bureau of Audio-Visual & School Library Svs.	School Library Resources-Program Supervision	ESEA Title II
"	Bureau of Audio-Visual & School Library Svs.	Instructional Television	ESEA Title V
"	Bureau of Health Ed., Phys. Ed., & Rec.	Health Ed., Physical Ed., & Recreation & Narcotics	State General Fund
"	Bureau of Health Ed., Phys. Ed., & Rec.	Smoking Health Project	State General Fund
"	Manpower Development & Training Act	MDTA Rural Project - Watts Area	Manpower Development & Training Act
Higher Education	Division Chief	Junior College Advisory Panel	ESEA Title V
" "	Adult Education	Basic Adult Education ESEA Title III (1966)	ESEA Title III (1966)

DIVISION	BUREAU OR OFFICE	UNIT TITLE	SOURCE OF FUNDS
Higher Education	Adult Education	Statewide Plan for Development and Implementation of Curriculum Research Project Involving Adult Students with Spanish Surnames	ESEA Title V
Public School Admin.	Bureau of Public School Admin. Svs.	Development of Transportation Supervision Program	ESEA Title V
" " "	Bureau of Public School Admin. Svs.	School Business Administration Workshops	ESEA Title V
" " "	Bureau of School Planning	School Planning Information Service	ESEA Title V
Compensatory Education	Chief of Division	Programs-Desegregation-Integration	ESEA Title V
" "	Chief of Division	Advisory Services School Desegregation	ESEA Title I